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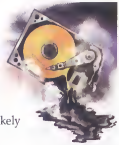

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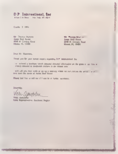

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TECHNOLOGY NEWS

Compiled by Cindy Krushenisky from AP and staff reports

Eye Contact

Finally, you might be able to forget that personal identification number (PIN) when you step up to an automatic teller machine (ATM) in the future. ATMs that know who you are just by looking at you are about to hit the streets. As you wait, a computer verifies your identity with a hidden camera that scans the 400-some identifying features of your iris and matches them to a huge database. Once your identity is verified, the camera checks for pupil movement to ensure it is not viewing a photograph. No match, no transaction. It may sound like science fiction, but Sensar Inc., a subsidiary of the David Sarnoff Research Center in Princeton, N.J., hopes that such a technology will soon make PINs and ATM cards obsolete.

The company's IrisIdent system already has been agreed upon by Japan's biggest ATM maker, Oki Electric Industry, and is still in the deal-making stage with NCR Corp., the world's biggest ATM maker. The system will be tested in Ohio at a handful of Huntington Bancshares' ATMs late this year.

IrisIdent's current error rate is 1 in 131,578 and will work through most glasses, contact lenses, and many sunglasses. However, it does have problems occasionally scanning very dark eyes.

Sensar already has competition in the biometrics identification field, in which physical characteristics are used to confirm someone's identify. Other companies are developing voiceprints, fingerprint and signature verification, handprints, facial recognition, and even retina scans. Already, there are banks in Arizona, Nevada, and Texas that require customers cashing checks to provide a fingerprint, according to the American Bankers Association, which has a task force working on ways to stay ahead of criminals. ■

Bundles Aren't What They Used To Be

Consumers expecting to get a complete library of software when they buy new PCs this year may be disappointed. PC makers plan to decrease the number of software titles bundled with their systems to attract customers.

Compaq, which included about 30 software titles in its PCs last year, has decided to reduce that number to less than 20 this fall. Packard Bell, Acer America, and NEC Corp. also have said they plan to cut back on bundled software this fall.

Why the change? Computer makers are zeroing in on software as a way to cut costs. Last year, PC prices went up. This year, however, the costs of many key computer components have dropped. To keep up with the competition, most companies must lower their system prices. Some companies figure a lot of the software isn't used anyway, and the companies initially included all the software to attract new PC owners. Now that the market seems to be maturing, there are fewer first-time buyers. PC makers still plan to pre-install a sample of software for productivity, reference, and games, but they plan to put more emphasis on Internet-related software.

Lower cost is great news for consumers, but smaller software bundles are bad news for software companies that rely heavily on revenues from bundling contracts, such as SoftKey and Mindscape. The companies say it won't affect them much now, as most manufacturers still bundle lots of software on PCs sold in other countries. But eventually, it may cause a crunch when the software companies see fewer profits from software upgrades down the line. ■

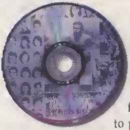
Sony Enters The PC Market

While some computer manufacturers aim to make their systems cheaper to attract more customers, Sony Corp. has taken a different route as it enters the PC market with flashy, high-priced systems aimed at gamers and other high-performance users.

The VAIO (Video Audio Integrated Operation) systems, ranging in price from $2,000 to $3,000, feature a color scheme with purple accents and an emphasis on high-quality video and audio. The new line includes high-powered Pentium 166 megahertz (MHz) and 200MHz microprocessors, at least 16 megabytes (MB) of random-access memory (RAM), at least 2.1 gigabyte (GB) hard drives, and 28.8 kilobits per second (Kbps) modems.

Last fall, Sony announced its intention to enter the PC market, a sign of a future in which computers are designed more like stereos and televisions. In fact, the company's long-term strategy is to lead the migration of computing into home electronics. Company officials also have said it was necessary to enter the PC market to get more experience working directly with customers, as most PC support and service often comes directly from a manufacturer. (Previously, when Sony products broke, most customers got help from independent repair shops.) This "self-servicing" approach will likely become more predominant as computer and consumer electronic products meld. ■

The New-Age Yearbook



Students may have to come up with an alternative to getting signatures on their high-school yearbooks. Yearbooks of the future just won't have the room.

Lincoln-Sudbury Regional High School of Sudbury, Mass., is among the first of several high schools in the nation to publish a CD-ROM version of its yearbook. The traditional 310-page yearbook took on an interactive edge for the '95-'96 school year. Along with more than 1,000 photos and a year's worth of school newspapers, schoolhouse sounds from hallway chatter to cafeteria chitchat have been added. One student's picture even morphs from high-school senior to gradeschooler in seconds. The discs hold much more information than books, but surprisingly, the CD-ROM versions were cheaper, costing about $20 compared to the $50 book version. Students did discover drawbacks: They couldn't get classmate signatures on the CD-ROMs, and the discs are difficult to take to Grandma's house to view if she doesn't have a computer with a CD-ROM drive. ■

Another Gates?

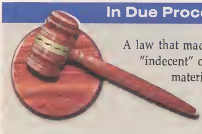
He's known as Japan's Bill Gates. Softbank Corp. president Masayoshi Son, the top name in Japan's personal computer business, is a rags-to-riches success story, somewhat like our Bill Gates, chairman and chief executive officer of Microsoft Corp.

Son, while in college in the United States, invented a pocket calculator that was later bought for $1 million by Sharp Corp. He then used the money to start Softbank in 1981 and began acquiring other companies. Softbank is now the largest software distributor in Japan and has acquired two prominent U.S. companies in the computer industry: Interface Group, the biggest producer of computer trade shows, and Ziff-Davis Publishing, a large publisher of computer magazines. Softbank is also the largest shareholder in the Internet search service Yahoo! Inc.

Son is described as patient and matter-of-fact but very unassuming and approachable. As a graduate of the University of California at Berkeley, he is adept at doing with business with Americans, giving him an edge over his Japanese rivals.

As for as being labeled Japan's Bill Gates, Son says it's an honor. Fortunately, Softbank deals with support businesses for the digital age, not in manufacturing the actual software, so Son is not in competition with Gates. Son says it would be terrible to have to compete with Gates, except in a game of golf. Son says he could probably beat him at that. ■

In Due Process



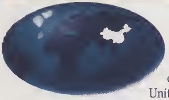
A law that made it illegal to publish "indecent" or "patently offensive" material on the Internet was overturned recently when the U.S. Third Circuit Court of Appeals in Philadelphia deemed it unconstitutional.

The Communications Decency Act, which was part of the Telecommunications Act of 1996, made posting indecent material accessible by children a crime punishable by up to two years in prison and a $250,000 fine. However, more than 50 communications firms, civil liberties organizations, and computer companies united and filed a lawsuit against the act.

The three-judge panel said that the Internet deserved the same free-speech rights that newspapers have, if not more. The judges added that software technology is available that can block materials with obscene language or other offensive content from reaching a user's PC, putting the control back into the hands of the parents.

With the law overturned, the Justice Department is prevented from enforcing or investigating violations of the act. But the fight isn't over. The decision will likely be appealed to the U.S. Supreme Court and may not receive a final ruling for almost a year. ■

A Piracy Predicament



Although the Chinese government says it is advancing its own economic policies rather than giving in to American demands, it decided to help the United States curb copyright piracy in its country. The arrangement was reached following U.S. threats of trade sanctions, which were initiated because Chinese officials supposedly shirked a 1995 agreement to stop copyright piracy of foreign music, films, and software. American companies claim the piracy cost them around $2.3 billion last year in lost sales.

After a lot of last-minute talks, China agreed to all the of Clinton administration's major demands to close factories producing pirate CDs, launch a crackdown in areas where piracy is most common, halt exports of pirated goods, and open its market to U.S. film and software. Just prior to the end of the talks, China fined and closed two companies making and selling pirated CDs and stopped production at a third company. The agreement, however, by no means indicates the Chinese side has made a major concession, according to the Chinese Foreign Ministry spokesman. ■

Pentagon's PC Program Bombs

Terrorism looks to be taking a high-tech turn, and America may not be ready for it. According to government investigators, hackers infiltrate Pentagon computers more than 160,000 times a year, threatening "catastrophic damage," but the military rarely detects and seldom investigates the interlopers. On top of that, a report from the General Accounting Office of Congress said as many as 250,000 attempts may have been made to penetrate military computer networks last year, and 65% of those were successful.

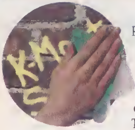
The report, which was presented to the Senate Governmental Affairs subcommittee on investigations earlier this year, dealt mainly with unclassified Pentagon data.

However, in some extreme scenarios, studies show that terrorists or other adversaries still could seize control of Defense information systems and seriously degrade the nation's ability to deploy and sustain military forces.

Some problems were attributed to poorly designed systems or to the use of off-the-shelf computer products without security safeguards. Pentagon spokespersons did stress that classified material was secure, as the Pentagon has invested in those systems so they are not subject to infiltration.

In response to this news, Attorney General Janet Reno proposed forming a federal rapid response group to deal with potential attacks by terrorists on the nation's computer networks. The interagency group would be headed by the FBI for emergency response to such threats while long-term solutions are studied. ■

Wiping Out Graffiti On The Web



The Internet: nirvana of free speech or public relations nightmare? Sure, if you have something to say, you can spend a weekend coding files and creating a World Wide Web site on the Internet. But what if that message bashes someone else?

Take, for example, the Kmart Sucks site a disgruntled employee created and filled with nasty comments about the business, or a First Boston site, in which a former employee published proprietary salary figures. Ever try to search for an official company site? You usually face thousands of company-related "hits" you must browse through until you find what you're looking for. Even then, disgruntled consumers or former employees may have copied the site—graphics and all—altering some information, maybe with different prices, sales results, or derogatory statements.

Some businesses have decided enough is enough. The public relations firm Middleberg and Associates is taking on "rogue" sites for clients, finding the people who created the false sites and then attempting to convince them to go offline. If persuasion isn't enough, the firm tries to frighten the creators off with a lawsuit. Sometimes it works, sometimes it doesn't. Derogatory comments are not necessarily illegal, and to prove libel, the company must show it actually has been damaged.

Another solution involves a third party that verifies Web sites, such as Application Programming & Development Inc. (APDI). For a fee, APDI endorses Web sites as official company sites and then places TrueSite Certified stamps on authentic sites. When users click a TrueSite stamp, APDI checks its registry database and gives users validation messages or notifies them if a site is bogus. If you only want to visit authentic business sites, search through the TrueSite Registry at http://www.truesite.net for an official listing. ■

Defending The Throne

It's tough to be king, in the computer industry anyway. To stay on top, Microsoft has to keep ahead of the competition on all fronts. Recently, the company has taken a lot of grief from Netscape Communications and its *Navigator* Web browser, which has about 80% of the Web browser market share. To compete in the Internet world, where computing seems to be heading, Microsoft needs to reassert its *Internet Explorer* Web browser. It may, however, have to do this at the cost of its Microsoft Network online service. The Microsoft Network is built into the Windows 95 operating system but has received some criticism for unfair competition.

Microsoft has secured a deal with both CompuServe and America Online that would build access to both online services into Win95, and in exchange, each online service would promote the Internet Explorer to its customers for browsing the Web. The deal sounds like a fair exchange, especially since it cancels out any talk of unfair competition for the Microsoft Network. But the online services say they plan to continue to provide their subscribers with access to Netscape's browser, as well.

On another front, Microsoft has to keep up with developments in the operating system industry. As the computer world works toward smaller devices, such as computerized watches and handheld Internet tools, it needs a scaled-down operating system to turn to.

DOS and Windows are too big for small computers, but after several fitful starts, Microsoft is closing in on a more suitable operating system, code-named Pegasus. Due out late this year, Pegasus is expected to have some basic database and communications functions, including Internet access, and will work with PCs that use Windows.

The competition is already out there. Palm Computing has developed an operating system for its Pilot handheld devices. Sun Microsystems has developed an operating system based on the Java programming language. And Lucent Technologies has announced an operating system called Inferno for handheld and other specialized computers that will rely on networks. ■

Tech Shorts

Conversations via videophones aren't as far off in your future as you may think. Intel recently improved its ProShare videophone product to use ordinary phone lines to transfer video and sound. In so doing, however, the picture will only move at a rate of 4 to 12 frames per second, which is very jerky compared to full-motion video with 30 frames per second. Computer companies such as Compaq and AST have made deals to include the video product in their PCs this fall. The only catch is that the cameras needed to transmit the video will likely be sold separately for about $200. The product also requires at least a Pentium 133MHz microprocessor; therefore, it won't work on most existing PCs.

……

You're at the office and forgot to turn on the air conditioner at home to combat the hot summer day. If you're a customer of Commonwealth Edison and Ameritech participating in a smart home trial in the Chicago area, you could just call home to turn on the AC by phone. As part of the test, five or six major appliances and the thermostat are wired so that the user may call home and punch in a code to turn an appliance off or on. Services should be available by the end of the year to 2,000 homes in the Chicago area, and at least 200 homes in southeastern Wisconsin should have the same service by the end of the year through Ameritech and Wisconsin Energy Corp. Eventually, officials predict the equipment may be used for home security and home monitoring. ■

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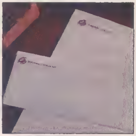

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The Real Price Of Calling For "Free"

Have you ever called Zimbabwe without paying a penny for the long-distance call?

You might . . . but in the meantime, your phone bills and existing computer hardware still dictate whether your dreams of Internet telephony will evaporate when you add up the bills and hassle of "free" talk via the Internet, headphones, and a microphone.

Assuming you have the right computer and regular phone service, the minimum requirements to get your system up and running are:

- **A 16-bit sound card**, preferably full-duplex ($100 and up).
- **A 14.4Kbps (kilobits per second) modem** ($60 and up), although 28.8Kbps will sound better.
- **Headphones** ($10 and up) or **speakers** ($20 and up).
- **A microphone** ($10 and up, or free with some software).
- **Software**. VocalTec's *Internet Phone*, which had the lion's share of users in 1995, is $49.95 for one copy. Quarterdeck's *WebTalk* is $49.95 for two copies and a microphone, and Camelot Corp.'s *DigiPhone* is $89.95 for two copies.
- **Initial minimum setup: $219.95.**

This much in mind, here are the things you should consider:

Do you already have most of the hardware you need? If the answer is "yes," your investment will be smaller and your payback sooner. However, if your primary goal is saving money and you spend a minimum amount on your setup, you'll end up with minimum sound quality. For instance, you don't *need* a **full-duplex** sound card, which lets both callers talk at the same time, but **half-duplex** sound cards, allowing only one person to talk while the other listens, aren't as conducive to natural conversations. Likewise, you don't *need* high-quality speakers or headphones, but you will certainly hear the difference.

Do you already pay for unlimited direct Internet access? If so, chalk one up against long-distance. If you aren't interested in spending limitless hours online, consider an hourly plan. Some services offer several free hours per month. Also, if you have the basics, many companies will let you download a free trial version of their software.

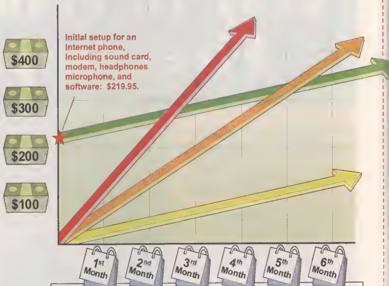
How about friends and family? Both Internet callers must have the same setup and software, so you can't call just anyone. Consider the number of people you call who even own a computer and talk to them about whether they could and would try Internet telephony.

Will it work for you? If you already play phone tag, connecting with people will just get harder because the person you call must be logged on to the Internet. You may have to establish calling times or even use long-distance to make an initial connection.

How much money do you spend calling people who would use Internet telephony? If you have unlimited Internet access, your call will cost the same whether you call next door for five minutes or halfway around the world for five hours. This might not do much good if you only make a few domestic calls each month, but if your business partner lives in England, it probably won't take long for Internet telephony to pay for itself. It'll cost even less if you split the price of a software package with two licenses. When you add up the numbers, however, remember that both sides pay for Internet calls, whereas only one person pays for long-distance.

If your time for telephony hasn't arrived, don't despair. You might decide it's worth the extra money just to have a new dimension in "chat" rooms. At the end of 1995, about 500,000 people already were "active users," and that number is expected to shoot to 16 million by 1999, according to the International Data Corp. As prices come down and more PCs have the necessary hardware, someday you may find a whole new kind of shock when you open your phone bill. ■

The Cost Of Internet Phone Calls vs. Telephone Calls*



Key:

🟩 **Internet phone user** who makes unlimited Intemet calls each month to anyone in the world who has the same software and setup ($20/month).

🟨 **Domestic user** who makes six 20-minute out-of-state phone calls each month ($20 40/month)

🟧 **Domestic and international user** who makes three 20-minute phone calls out-of-state (but within the continental United Stetes) each month and a 20-minute call each month to Mexico, Russia, and the United Kingdom ($62.80/month).

🟥 **International user** who makes a 20-minute phone call each month to the following countries Canada, Mexico, Australia, the United Kingdom, Russia, and Japan ($107 20/month)

* Long-distance Service – Domestic calls are based on average evening rates from Chicago using AT&T, while international calls are based on early evening rates from Chicago using an AT&T international plan, with the price of the plan included

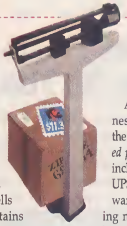
Of Mice And Chocolate

Computers may be the best thing since sliced bread, but how do they compare to cookies and chocolate bars? Fortunately, that's one dilemma we'll never have to consider now that the Apple Cookie & Chocolate Company started selling delectable computer treats. You can order milk chocolate diskettes and monitors, white chocolate mice, and an assorted variety of "multichip" cookies, including chocolate chip, peanut butter, oatmeal raisin, and butterscotch nut. After a morning of rigorous taste tests, our staff wholeheartedly—and full-belliedly—agreed that these goodies are superb!

For More Information:

Apple Cookie & Chocolate Company
(800) 223-9866
(412) 825-3550 ■

The Savings Are In The Mail



Despite the rising popularity of electronic mail and fax machines, one of the most popular means of business communication continues to be manual post and parcel delivery. Unfortunately, businesses frequently spend more than they need to on postal expenses. But for many companies, the effort of determining the correct postage and shopping around for the most cost-efficient carrier hasn't outweighed the few pennies saved per letter.

Until now. Elefunt Software's *RateFinder* makes it easy for businesses to turn those pennies into a substantial savings. Simply type in the ZIP code, city, or country of the intended recipient and the weight of the package or letter to be sent, and RateFinder will reveal the current shipping rates of Airborne Express, Federal Express, UPS, RPS (Roadway Package System), and the U.S. Postal Service. The application also lets businesses add the rates of additional carriers.

RateFinder sells for $149 and includes six months of free rate updates. Additional year-long update subscriptions sell for $59. Businesses can download a free copy of RateFinder from the Elefunt Software Web site (http://www.elefunt.com). This version, however, only gives users the first class, third class, fourth class, special fourth class, express, and priority mail shipping rates of the U.S. Postal Service.

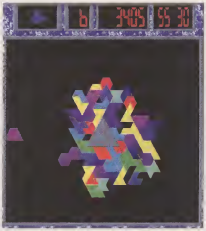
For businesses who do a considerable amount of shipping, Elefunt Software also sells *ShipSmartz*, which contains all the features of RateFinder plus a few extras. Businesses can store the company name and address of frequent addressees, keep a log of all shipping transactions, and print mailing labels. *ShipSmartz UPS*, a UPS-accepted version of ShipSmartz, also prints out UPS paperwork and reports. ShipSmartz sells for $239; ShipSmartz UPS sells for $489.

Another product businesses can purchase is the *ShipSmartz pre-accepted package for PC*, which includes the ShipSmartz UPS software, a bar-code wand for entering tracking numbers, and a scale that connects to a computer and works directly with the ShipSmartz application. This product sells for $1,489.

For More Information:

RateFinder
ShipSmartz
Elefunt Software
(800) 765-7447
(510) 843-7725 ■

Pits And Pieces



With five pit choices and 72 different shapes, *Hexis* challenges even the most ardent *Tetris* player.

To avoid any confusion: Yes, *Hexis* is a chip off the old *Tetris* block. Hexis players try to arrange dropping interlocking pieces in solid rows along the bottom of a playing area or pit. When a solid row is created, that row disappears, giving the player more room within the pit to maneuver the shapes. The game ends when the pit can't hold anymore pieces.

Hexis enhances the challenge, however, by pitching 72 shapes into five different pits, including pits that have a central target rather than a bottom border. (Tetris had eight shapes and one pit.) The game lets players choose the level of difficulty before playing and also has competitive modes for multiplayer games. In short, Hexis is to Tetris as Rummy is to Go Fish. And at a bargain price of $15, Hexis is slightly cheaper than a large pizza.

NOTE: Hexis isn't affiliated with Tetris in any way.

For More Information:

Hexis
Kantar Development Corp.
(800) 250-5813
(303) 743-8031 ■

A New Twist On Colors

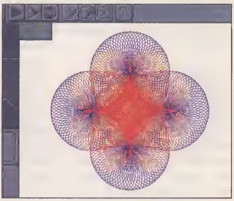
ColorTwister won't teach you about history or help you organize your financial information. It's neither a utility nor an operating system; not a word processor, a database, or a game. Actually, ColorTwister has no practical usage as far as we can tell. But none of that really matters for one good reason—ColorTwister is fun.

Essentially, ColorTwister is the '90s version of the pens-and-papers Spirograph made popular in the 1950s. The users make the artistic decisions, such as which colors to apply and the size and shape of the tracing pieces, and ColorTwister spins out a perfectly symmetrical design that can be printed or saved to bitmap format for later use.

With its easy point-and-click interface and bright spinning colors, ColorTwister is a great way to introduce young children to the computer. It's also inexpensive; ColorTwister sells for less than $20.

For More Information:

ColorTwister
CycloGraphics
(608) 288-1713 ■



The bright colors and intricate designs of *ColorTwister* will attract younger children to the computer screen.

See The Writing On The Screen

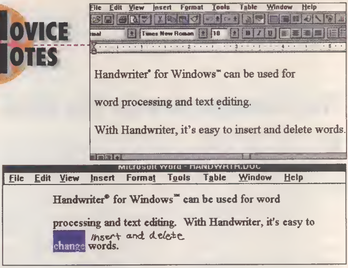
Like the beer commercial says, it just can't get any better than this. Universal communication capabilities and computers that play movies and perform mathematical calculations are a part of everyday life. We have 24-hour entertainment cabled into our homes and phones that answer calls for us. In some areas of technology, it's hard to imagine the future getting much better.

Computerized handwriting recognition is not one of these areas. Traditionally, handwriting recognition systems have been more impressive as conversation pieces than as practical devices. But if Communication Intelligence Corp.'s Handwriter for Windows is any indication, things are improving.

In a dramatic improvement over handwriting recognition systems of the past, Handwriter for Windows actually understands much of what is written as long as the letters are legibly printed. The system can decipher two or three letters tied together, and it recognizes symbols, such as &, @, and $, as well as spaces between words. Most impressive, however, are the editing capabilities of the system. Users can edit almost any document using the stylus and writing tablet and a few simple editing commands. For example, a slash (/) written over the top of a letter deletes that letter, while a backslash (\) indicates a backspace.

Of course, Handwriter for Windows isn't perfect. As with any handwriting recognition system, the stylus-and-writing-tablet method of data entry introduces many more errors than keyboard data entry. Good typists in particular will find that the frequency of errors makes it slower and more cumbersome than using a keyboard. Each letter needs to be carefully formed, and mistakes can't be corrected until the handwritten letters have been converted into digital text. It also takes a while to get used to the writing style and learn the editing commands.

But all in all, Handwriter for Windows shows substantial improvements over similar systems, especially in regard to letter recognition, and it aptly demonstrates the potential of handwriting recognition systems. Young children can use the Handwriter to learn how to form letters correctly, and as a security device, handwriting recognition systems provide an additional means of access control.


File Edit View Insert Format Tools Table Window Help
Times New Roman
10
Microsoft Word - HANDWRTR.DOC
File Edit View Insert Format Tools Table Window Help

Handwriter® for Windows™ can be used for

word processing and text editing.

With Handwriter, it's easy to insert and delete words.

Handwriter® for Windows™ can be used for word

processing and text editing. With Handwriter, it's easy to

insert and delete

change words.

Handwriter for Windows lets users edit digital documents with a pen. Just write in the correction (bottom), and Handwriter will amend the text (top).

Handwriter for Windows includes a stylus and a large writing tablet that connects to a serial port on the back of the computer. The 10-foot connecting cable gives the user plenty of room to spread out; the stylus has no cord and is powered by four watch batteries. Handwriter also includes *Lyriq Crosswords* and the *Signature Sentinel* signature-protected screen saver, which uses signature recognition to control access to the computer. Not all of these options are available when using Handwriter for Windows with Windows 95; it's designed for and offers the most features when used with Windows 3.1x. Handwriter retails for $299.

For More Information:

Handwriter for Windows
Communication Intelligence Corp.
(800) 888-8242
(415) 802-7888 ■

Computer Talk

Voice recognition software has traditionally demonstrated a need for improvement. The human voice is unique to every individual so developing an application that can recognize different voices as well as maintain a universal nature so that anyone can use it has proven to be a daunting task.

The *Kurzweil VoicePad* seems to be a step in the right direction. It's armed with a vocabulary of 12,000 words and room to store an additional 500 for each user. Also, it has a simple setup that only asks users to say the numbers one through eight and the word "testing." Its editing commands are even intuitive and easy to use. Finally, prior to use, the system checks for background noises, then ignores sounds made at that decibel level.

The VoicePad does have drawbacks. Breathe too loudly, and it will think something was said. Users have to talk slowly so it can understand the words. Mistakes are difficult to correct, and the system doesn't work with other applications. Finally, the VoicePad may be too slow for a good typist. But even at the slow talking pace, the product can decipher up to 60 words per minute, a pace on par with an average typist.

Kurzweil VoicePad is available only through the Internet. Users need to register at the Kurzweil Web site (http://www.kurzweil.com), then they can download a copy for free. After 30 days, users who are impressed with the product can choose to purchase it from Kurzweil for $49.95. The VoicePad requires a computer with a Pentium processor and Windows 95, as well as a microphone for data input.

Because a microphone is the only equipment needed for voice-sensitive data input, voice recognition could have practical uses in the future. Watch any episode of "Star Trek" to see a couple.

For More Information:

Kurzweil VoicePad
Kurzweil Applied Intelligence Inc.
(800) 380-1234
(617) 893-5151
http://www.kurzweil.com ■

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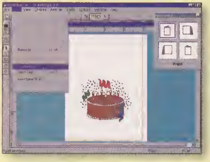

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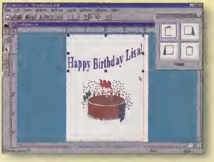

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DOS' Internal And External Commands

Gleason

When you move to a new town, learning to get around the area is probably one of the most important things you can do to adjust. Driving around disoriented only adds to the frustration of organizing your life in a new place. The same is true of DOS. Knowing a little about DOS directories and its types of commands goes a long way toward making you more comfortable and productive with your computer.

As you may already know, DOS functions are carried out by commands, which are like miniprograms that run when the command name is entered at the DOS prompt. What you may not know, however, is that there are two types of DOS commands—**internal** and **external**. The difference between these commands lies in the directories from which you can execute them.

Information in PCs is arranged in **directories**, which are listings of files that are present in a certain location in the computer. Think of your directory as a kind of electronic filing cabinet. If you've just booted (or started) up your computer, you're probably working with the **root** directory, which is like the filing cabinet in that it contains all other directories, known as **subdirectories**, and files. Subdirectories are like individual file drawers within a larger filing cabinet. For example, if a directory only contained information relating to cross-country camping trips, you could have subdirectories named CAMPING, AAA, PARKS, and so on.

Unless you specify otherwise, the computer saves all work to the **current** directory. This is the location searched first for a file and where files are saved if another directory is not specified. To tell what the current directory is, look at the word following your C> prompt. If your prompt says C>WINDOWS, the current directory is WINDOWS.

The current directory doesn't matter when you're executing internal commands. You can type an internal command from any directory because these commands are automatically loaded with Command.com (a program that handles commands) when DOS starts up and are kept in random-access memory (RAM). This means that the computer won't have to search for an internal command in a directory but can instead pull the command from memory and execute it at any prompt. Examples of internal commands include COPY, DATE, TIME, VERIFY, EXIT, DIR, and DEL.

Directories do become important with external commands. These commands aren't automatically booted with Command.com nor do they permanently take up room in RAM. To find external commands, your computer conducts a search, copies them into RAM, and then erases them from RAM after they've been used. In this way, RAM space is saved for other information. If your computer stored both internal and external commands in RAM, there would be less memory left for application programs such as *Microsoft Word*.

Following The Path. External commands only work from the DOS directory (C>DOS) because otherwise, the computer doesn't know where to locate them. You can get around this limitation and use external commands from any prompt by including a PATH statement in your **Autoexec.bat** file, a series of commands that automatically execute when your computer boots up.

The PATH statement lets you specify additional directories where DOS can search for executable, or usable, external commands. After DOS finds the command in one of these directories, it carries it out. You won't notice all of this happening because it occurs within milliseconds (although to speed up PATH even more, you should put the most frequently used directions at the beginning of the PATH command). A PATH command in your Autoexec.bat file tells your computer at startup to automatically load directions about how to get external commands.

Most computers already have a PATH statement included in their Autoexec.bat files. How do you know if you have a PATH statement? If for some reason you can't get an external command, such as FORMAT, to work at a prompt, you may not have a PATH statement telling the computer where to look. To see the current search path, type **path** at the DOS prompt.

Including a PATH statement in Autoexec.bat requires telling the computer the right place to look. For example, to tell your computer to look at the DOS directory for external commands, type:

```
path=c:\dos
```

The exact structure of this line depends upon the type of application programs installed on your hard drive.

NOTE: Your Autoexec.bat file is crucial to your computer's operation. Don't alter any part of Autoexec.bat you don't understand without making a backup copy on diskette.

Don't worry if you don't immediately understand every part of DOS; it can take a while to get used to. Understanding how directories, internal and external commands, and PATH work together, however, helps make that adjustment a little easier. ■

by Erin Duncan

Getting Organized With Windows Cardfile

Even if you don't consider Windows 3.1 the answer to all problems, it does have a solution for one universal headache: misplaced recipe and address cards. Windows Cardfile follows the same principles as a box of index cards. It loads quickly and runs in the background without using much memory, but it has enough muscle to accommodate graphics and dial phone numbers. Best of all, it's easy to learn.

To begin, open Program Manager, double-click Accessories and then the Cardfile icon. You'll see a blank card. The top part is the Index Line, which determines how the card is alphabetized, and the bottom part is a larger area for text. You might use the Index Line for a name and the text area for an address.

To create your first card, go to the Card menu and choose Add. Cardfile displays a box and asks what you want to "add." This information is the Index Line, so think before you type. Do you want your friends ordered by their first names or last? Do you want a card for "asparagus soup" or "soup, asparagus?"

After you type an Index Line, Cardfile creates the card and lets you type the text. Again, plan carefully so you can find things later. (If you want Cardfile to dial phone numbers, as we'll discuss later, put them on the first line either with or without spaces, parentheses, or dashes.) When you finish typing, repeat the steps to add another card.

Getting Around. When you first load Cardfile and start creating cards, you'll see the Card view, which shows the entire front card and the Index Lines of those directly behind it. The Index view, alternately, displays a list of Index Lines. This can be changed under the View menu, which helps you navigate Cardfile as your stack gets taller.

To bring a card to the front in Card view, click the card or move through the stack by clicking the arrows below the menu bar. If you're in the List view, use the arrows to move up and down, click the Index Line, and go back to the Card view.

If you don't want to flip through the stack of cards, use Find and Go To, both under Search. Go To searches Index Lines, and Find looks on the text and *not* the Index Lines. In both cases, you can use a whole word or words, or just a few characters.

If you're looking for a woman named "Kristin" whose last name you don't remember, select Go To and type **kristin**. If you're unsure whether she's "Kristin," "Kristen," or "Kris," type the letters you know. If several Index Lines include those letters, you may have to repeat the process.

To look for information on the card itself, use Find. For instance, if you're tracking birthdays and if you entered them consistently (such as 2/25, 10/5, and so on), you can easily locate a birthday in October. Select Find, type **10/**, and select Find Next until you see the card you want.

You always can edit the information of the card in front. The cursor automatically appears to let you edit the text. To change the Index Line, select Index from the Edit menu.

Finishing Touches. When you're done, choose Save from the File menu and type a file name. (DOS adds a .CRD extension.) You can create as many different "boxes" as your diskette or hard drive can hold by choosing New from the File menu and adding new cards. To open an existing Cardfile, select Open from the File menu.

You also can print from the File menu. In the Card view, you can Print (for the card in front) or Print All (for the whole stack); in the Index view, you only can Print All (for a list of Index Lines).

Advanced Uses. That's the basics, but you also can copy, embed, or link graphics. The details of these uses are beyond the scope of this article, so check the online Help command and the documentation of the graphic's application.

If your computer and phone are hooked up to a modem, Cardfile can dial the phone number of the card in the front of the stack. Select Autodial under the Card menu. After you adjust the Setup for your modem, Cardfile will display the number it's calling, let you set any prefixes (such as "1" for long distance), and tell you to pick up the phone.

Be creative with uses for Cardfile. Do you want to index your compact discs? Or organize your job hunt? The possibilities are endless. Setup takes a small time commitment, but with a little planning, your investment will be well worth it. ■

by Sarah Scalet

Windows 95's Dual-Boot Option

If you're considering switching to Windows 95 but aren't quite ready to let go of your old operating system yet, you can have your cake and eat it, too. Win95 offers a dual-boot option that lets you keep two operating systems on your computer simultaneously, letting you choose which to use in any given instance.

For New Win95 Converts. To take advantage of this option if you haven't yet installed Win95, leave your old operating system on your computer when you upgrade to Win95. When the Win95 setup program asks you to confirm the directory into which you want to load Win95, make sure it's a new directory, not the directory used by your current operating system. For example, if you're installing Win95 onto a computer with Windows 3.1 and Windows 3.1 is located in your C:\WINDOWS directory, name the Win95 directory C:\WIN95. By preserving the old directory, you'll keep the old operating system on your hard drive, ready for use anytime you need it.

There are two ways to access the old operating system. To use it right away when you start up your computer, press F8 when the screen says "Starting Windows 95." From the menu that appears, choose Command Prompt Only and press ENTER. At the prompt, type

```
cd windows
```

and press ENTER to switch to your old Windows directory. To use DOS, type

```
cd dos
```

and press ENTER to switch to your DOS directory.

Then, if you're starting an older version of Windows, type

```
win
```

at the C:\WINDOWS prompt and press ENTER to start Windows 3.1. (If you type win without switching to the directory containing the old operating system, you'll start Win95.)

If you're already running Win95 and want to switch to the old operating system, choose Shut Down from the Start menu, then choose Restart The Computer from the Shut Down Windows dialog box and left-click Yes. When the computer restarts, follow the same steps as above.

After The Fact. If you've already installed Win95 in the same directory that held your previous version of Windows, you can still set it up so that you can boot to your previous version of MS-DOS. It's a little trickier than just installing Win95 in a new directory, but it works. Choose Find from Win95's Start menu and left-click Files Or Folders. Type

```
msdos.sys
```

in the Named box and left-click Find Now.

If Win95 doesn't find the file, it may be a hidden file. (**Hidden files** have been marked so they don't show in directory trees such as those in File Manager or My Computer, and they won't be found by a file search.) Open My Computer, then choose Options from the View menu. Left-click the View tab and left-click Show All Files, then OK. Close My Computer and start with Find again, following the steps listed above.

When Win95 finds the Msdos.sys file, right-click it and choose Properties from the pop-up menu. Left-click the check boxes for Read-Only and Hidden to turn off these attributes so you can work on the file. (**Read-only files**, as their name implies, are files that can be read but not altered.) Left-click OK, right-click Msdos.sys in the Find window again, and left-click Open With from the pop-up menu. In the Choose The Program You Want To Use box, choose WordPad and left-click OK. This will open Msdos.sys in WordPad. Add this line

```
BootMulti=1
```

in the [options] section of the file, save the file, and quit WordPad. Right-click the Msdos.sys icon again and choose Properties from the pop-up menu. Left-click the check boxes for Read-Only and Hidden again to turn these properties back on and left-click OK.

Close the Find window and restart your computer for the new setting to take effect.

To boot to your previous version of MS-DOS after this process, press F4 when you see the Starting Windows 95 message.

An Imperfect Solution. There are a few disadvantages to dual-booting Win95. The first is that you need enough memory for both operating systems. The second is that you'll have to re-install your Windows 3.1-based applications for them to run properly under Win95. (If you install Win95 in the same directory as an older version of Windows, Win95 will retain the settings from that directory, so you won't need to re-install the programs.) A more minor disadvantage is that the setup process may be lengthier and slightly more complicated for a dual-boot setup than for the standard setup because Win95 can't get settings from the older version of Windows.

Despite these disadvantages, you'll find that keeping your old operating system can make the transition to Win95 easier. If you have trouble finding things at first, you can always go back to your old operating system to get something done and take your time getting acquainted with Win95. ■

by Diana K. McLean

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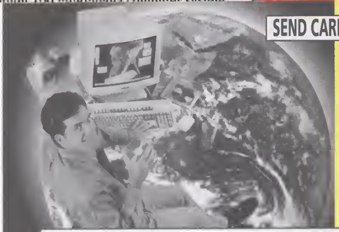

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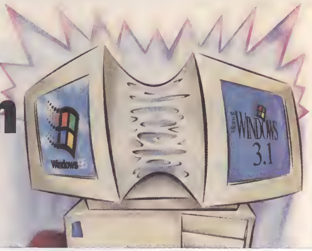
Windows 95's Dual-Boot Option



If you're considering switching to Windows 95 but aren't quite ready to let go of your old operating system yet, you can have your cake and eat it, too. Win95 offers a dual-boot option that lets you keep two operating systems on your computer simultaneously, letting you choose which to use
stance.

For New Win95 Con
advantage of this option if yo
stalled Win95, leave your old
on your computer when y
Win95. When the Win95 setu
you to confirm the directory
want to load Win95, make su
rectory, not the directory used
operating system. For examp
stalling Win95 onto a compute
3.1 and Windows 3.1 is l
C:\WINDOWS directory, nan
rectory C:\WIN95. By preser
rectory, you'll keep the old c
on your hard drive, ready for
need it.

There are two ways to acc
ating system. To use it right
start up your computer, pre
screen says "Starting Windov
menu that appears, choose C
Only and press ENTER. At the

```
cd windows
```

and press ENTER to swit
Windows directory. To use DC

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cd dos
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and press ENTER to switch to
tory.

Then, if you're starting an
Windows, type

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win
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at the C:\WINDOWS pro
ENTER to start Windows 3.1.

without switching to the directory containing the old operating system, you'll start Win95.)

If you're already running Win95 and want to switch to

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Sneak A Peek At Merlin

Gleason

A new operating system is lurking in the shadows—agent OS/2 X. Code name: "Merlin."

IBM is updating and rearranging its OS/2 Warp operating system and, for now, is calling it Merlin. If you like the old OS/2 (often lauded for its 32-bit power and strong **multitasking**, or ability to run several programs), be ready for some surprises in the new version. If you're unfamiliar with OS/2 (which has struggled to gain a foothold in a Windows-dominated market), you might want to take a look; there's some fun stuff inside.

Don't, however, look for "Merlin" in stores. We like the name, but alas, Merlin is only a code name and appears for a limited time. Whatever its final name, the product is due to come out some time this year. The **beta version** shipped at the end of June, and we're anxious to see whether Merlin lives up to all of its promises. (Beta versions are pre-release versions that manufacturers send to users for test runs.) We took a cursory look at the beta version, and our first impression was that OS/2 has made some strides at becoming a little more innovative and a little more user-friendly, but it still has some work to do.

The majority of Merlin's new tricks targets business users large, small, and anything in between. A lot of the new features, however, are attractive for the home user as well. The new gadgets that should please the masses include enhanced Internet capabilities and a voice-recognition feature that takes the idea of "user friendly" to a new level.

Opening Communication Lines. The voice-recognition feature is one of Merlin's more adventurous new offerings. IBM claims users will be able to navigate the operating system and applications simply by stating requests without touching a keyboard. *VoiceType*, the voice-recognition software included in Merlin, is a low-end voice-recognition program. It requires no initial setup, so you should be able to use it immediately after installation.

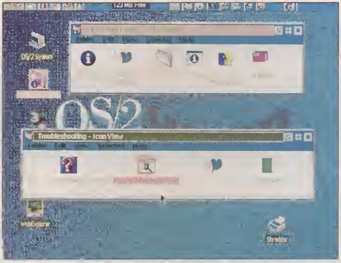
In our review, VoiceType was not quite accurate enough for full-blown document dictation. It can differentiate between confusing words such as "to," "too," and "two" or "right" and "write" by deciphering the context from the words around it, but it still has difficulty recognizing words as you speak them. With the current voice-recognition technology, average typists still can type thoughts on a keyboard faster and more accurately than they can dictate them. The most convenient use for the voice-recognition utility is as a navigational tool, similar to a keyboard or mouse. The technology allows dictation, but the level of accuracy will probably keep it from being a true timesaver for many users.

Though we were underwhelmed by OS/2's voice offering, we're excited about this technology's evolution into the standard tool it could become. Even IBM's crew reminds users to keep their voice-recognition ideas realistic. "You'll be able to talk to your computer, but this isn't 'Star Trek,' " says Rob Crawley, an IBM spokesperson.

Merlin Online. Merlin brings Java (an Internet programming language that supports animation, real-time video, multiplayer interactive games, and real-time sound) to the operating system. The language makes universal compatibility possible because a Java applet contains not only the file, but the written code needed to run it. Java's blessings extend beyond time spent online. One of the largest benefits to including it in the latest OS/2 version is that users can take advantage of downloaded applets while working offline. All of the beneficial capabilities Java adds to Web sites also can appear on your desktop.

IBM has enhanced its already user-friendly online package with a system that creates a more seamless link between the Internet and the desktop. The new integration package will let users download Internet files by dragging and dropping them to the desktop. This quick download process works for files on a local-area network (LAN) as well as the Internet. The drag and drop has a couple of different results for Web pages. You can download a file from a Web page or create a bookmark, or Quicklist, on your desktop. When you drop a Web page to your desktop, you will copy the Universal Resource Locator (URL), or Web page address, to a Quicklist. In the Quicklist, you can organize your favorite Web pages into folders on your desktop and then access them with a mouse-click or spoken command. You can upload, or transfer files to the Internet, with the same simple drag-and-drop process.

IBM has taken further advantage of online connectivity to bring technical support directly to the user. One of the largest problems with the current technical support system is the medium by which it travels. Computer hardware and software companies alike have made almost no effort to bring their technicians to you. Then they have the audacity to charge you for a long-distance call when the equipment breaks down or the manual lacks information you need.



The Assistance Center contains personal system management and technical support tools like WarpGuide and Remote Support to put desktop maintenance within easy reach.

With Merlin's Remote Support, a technical support representative can dial into your computer (with your permission, of course) and look at your machine to detect the problem quickly. The user retains the power to terminate the connection at any time. This system lets both user and technical assistance representative watch the screen at the same time. You actually can see what the person on the other end of the telephone line is doing to correct whatever problem your machine may have. If it's something you're doing incorrectly, the representative can walk you through the process step-by-step and show you how to correct your own mistake.

If you have a single phone line, you'll communicate with the service representative through a dialog window that lets you chat in real time. If you have two phone lines, one for your modem and one for your phone, or a **DSVD modem**, you can speak to service representatives as they're tinkering with your system. (DSVD, digital simultaneous voice and data, modems let two users speak to each other while they're both online. See "DSVD Modems Let Your Voice Be Heard!" in this issue.)

Merlin Goes Mobile. As portable PCs stretch the office around the world, many business users face the problem of synchronizing files on their portable computers with files on the office network.

Merlin offers Mobile File Synchronization to ease these transitions between mobile and traditional offices. Mobile Synchronization automatically takes information from altered files and updates them on the network. If someone has been making changes to the same file (either on the network or on their own portable), Merlin will make all changes and smooth the file reconciliation.

Fine-tuning. While Merlin makes out-of-office experiences possible by improving Internet and portable connectivity, it's also trying to make working at your desk easier. Merlin steps in to ease component installation with the new Warp Guide feature, which is supposed to work a lot like the Windows 95 Wizard. The Warp Guide activates itself by using a form of artificial intelligence when it "senses" a user installing a new piece of hardware. Though the Guide is supposed to appear and give you advice, it doesn't really compare to having the installation basically completed for you. But this is a step in the right direction.

The new interface resembles the current Win95 setup with a row of icons lined up in a column along the left-hand side of the screen. Merlin has a ribbon-like WarpCenter task bar that strongly resembles the Win95 interface.

With Merlin's Remote Support, a technical support representative can dial into your computer and detect problems quickly.

The icon-oriented WarpCenter runs along the top or bottom of the screen at all times, even when the user is within an application. It includes a button, much like the Win95 Start button, that shows everything on the desktop when users click it. Users can customize the WarpCenter to contain whatever they want including folders and frequently used programs.

Users also can group folders into trays (a type of drawer for organizing programs used less often) and drag and drop the programs they want onto the folders and trays. The WarpCenter contains quite a few icons that let users check the status of their systems, including available memory, battery status for notebook users, etc. An icon lets users view all programs running at that moment. Merlin also stores all of the system management tools in one folder called The Assistance Center. The Center contains personal system management and technical support tools such as WarpGuide and Remote Support to put desktop maintenance within easy reach.

With Merlin, OS/2 is finally bowing to the power of the **TrueType** font. Users running word processors on previous versions of OS/2 have long since faced the fact that what you see on-screen is not necessarily what you get in print. TrueType is the typeface standard used by many applications. Until Merlin, however, IBM stuck to the PostScript standard (a higher-end standard) used primarily for fonts that may be a little sharper, but use more memory, than TrueType fonts. As a result, the preview seen on your pre-Merlin, OS/2-driven monitor may look quite a bit different from the printed page scrolling out of your TrueType printer. Merlin's step toward generally accepted industry standards is overdue, and we extend a round of applause to OS/2 for the move.

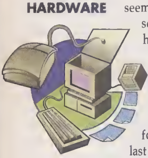
With so much promise coming out of IBM's press releases, we await the arrival of Merlin eagerly. IBM has created a lot of expectations for its latest operating system to live up to. We must wait to see if it will pass muster or merely pass into operating system history. ■

by Elizabeth Panska

Basic Training

Regardless of the operating system you choose, there are a few elementary functions you should understand. This monthly section is your one-stop guide to learning these crucial first steps in DOS, OS/2 Warp, Windows 3.1, and Windows 95. Use it to learn your operating system and see whether others offer a smarter way to work.

ADDING HARDWARE



No matter how complete your computer seemed when you bought it, it's likely that at some point you'll end up wanting to add some hardware to your system. It may be a scanner, a different pointing device, a faster modem, or any number of other enhancements. For most hardware installations, the steps are similar. (Printers are handled differently from other peripherals in some cases; for information about setting up your printer, see last month's "Basic Training.") For the following examples, we used the Expert Mouse 4.0 from Kensington. The steps may vary slightly from those required by the device you're installing.

No matter which operating system you're using, you'll usually complete the physical installation of the new hardware device before turning on the computer. In some cases, this means only plugging a cable from the device into a port on the back of your computer. **Ports** are the sockets in the back of your computer case. They let the computer communicate with the peripheral devices, with each device connecting to a specific kind of port. For example, a mouse can connect to a serial port or a special mouse port, while printers usually connect to parallel ports. (**Serial ports** transmit data one bit at a time, while **parallel ports** transmit data one byte, or eight bits, at a time.) In the installation of other devices, such as internal modems or sound cards, you'll need to open your computer case and install a circuit board inside the computer. Some devices, such as light pens and some other input devices, require both the installation of a board inside the computer case and an external connection between the device and the computer by way of a port as described above.

MS-DOS 6.22

Installing hardware on a computer running only DOS is fairly straightforward. After you've plugged the new device into the appropriate port at the back of your PC, turn on the computer. When the C> prompt appears, insert the installation diskette that came with the hardware you're installing. This diskette contains the device driver necessary for your device to interact with DOS. (A **device driver** is a program designed to control a specific hardware device. This program acts as a go-between for the device and other software, making certain that the device responds appropriately to the software's commands.)

After inserting the diskette, switch to the diskette drive. For example, if your diskette drive is your A: drive, as is typical, type **a:** at the C> prompt and press ENTER. The prompt will now be the A> prompt, indicating that the diskette drive is the active drive.

Then, type the command to begin the setup or installation program on the diskette. The command is usually **setup** or **install**. (The manual will tell you what the exact command is.)

From this point, follow the directions provided by the hardware setup program. There are a few steps common to all hardware installations. One of the first is usually to confirm the drive and directory to which you want to install the software for your new device. The default is usually entered for you; it's usually your C> drive and a new directory created for the hardware. To accept this option, press ENTER. If you want to change the directory to which the software will be installed, type the path and press ENTER.

You may be asked some questions about your preferences about the installation, but from this point, the software takes over, installing the necessary files to your hard drive. When the setup program completes, you'll be notified that installation was successful. You may be required to restart your computer for any new settings to take effect.

Some hardware setup programs give you the option of installing a Control Panel or similar feature, which lets you easily adjust the settings of your new hardware device. If you have the room on your hard drive, choose to install this feature, as it greatly simplifies fine-tuning your hardware's settings.

OS/2 Warp Connect

The first step when you're considering installing any type of hardware device on a system with OS/2 is to make sure that either the device is OS/2-compatible or that you have a driver that will make the device work under OS/2. (You should have received an OS/2 Hardware Compatibility List with your purchase of the operating system. This booklet lists the products that are OS/2-compatible, and if the device requires a driver not included with either the device or OS/2, the name of the driver is listed.) In many cases, you may need to download a driver from a manufacturer's bulletin board system or World Wide Web site.

If you have a diskette with the installation program for your device (compatible with OS/2), insert the diskette into the diskette drive, double left-click Drives (which may be located in the OS/2 System folder), double left-click the appropriate drive icon, then double left-click the program icon for the setup program. After following the setup instructions, you'll be told to reboot. After you do that, the new device's settings should be in effect.

The other way to install a new device is to left-click the OS/2 System icon, then choose OS/2 Warp Connect Install/Remove, then OS/2 Warp Selective Install. Left-click the icon for the type of device you want to add, choose your specific device from the available list, and left-click OK. Again, reboot the computer after making the change.

Windows 3.1

Installing hardware with Windows 3.1 is fairly easy, too. After you start your computer with the hardware plugged in, start Windows. Make sure your applications are closed and insert the installation diskette for the hardware device. In Program Manager, choose Run from the File menu and type the command to run the setup program. You'll type something like

```
a:setup
```

to indicate to Windows that the setup file is on a diskette in your A: drive; again, the hardware manual will tell you the exact name of the file. You also can use the Browse button in the Run dialog box to locate the file you want. Choose the A: drive from the drive list and scroll through the list of files on the diskette until you see one that says setup or install. The file should have the file extension .EXE, which means it is an executable program. (An **executable program** is a program that is ready to be run without any alteration by the user.)

Again, you'll follow the instructions in the setup program. You'll go through the same basic steps as you did with DOS.

At the end of the installation, you'll probably be prompted to restart Windows; usually you just press ENTER for Setup to do it automatically. When Windows restarts, the new device should be up and running.

Windows 95

If you're lucky, Windows 95 will detect the hardware automatically if you turn on your computer after plugging in the device. If it does, the installation will be very easy. Win95 will tell you what hardware it found, you'll confirm that that hardware is indeed what you want to install, and Win95 will install the necessary software, possibly prompting you to insert an installation diskette that came with the device. All you need to do then is restart Win95 for the new settings to take effect.

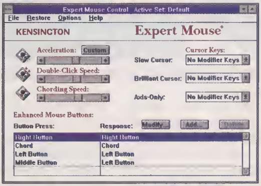
If Win95 doesn't detect the device on its own, a situation more common than Microsoft likes to admit, you'll need to help it out. Open My Computer and Control Panel and choose the Add New Hardware icon. Left-click Next to begin the process. You'll be asked whether you want Windows to detect the new hardware; choose Yes and left-click Next. The search can take several minutes. If the progress indicator stops for several minutes, restart your computer and try again. When the search is complete, left-click Details to see what devices, if any, Win95 detected. If the one you're adding is on the list, left-click Finish, and Win95 will install the necessary software. Again, restart Win95 for the new hardware settings to take effect.

If, on the other hand, the device you're installing isn't on the list of devices Win95 found, left-click Cancel. This dumps you back into the Control Panel; choose Add New Hardware again, but this time choose No when you're asked whether you want Win95 to search. Left-click Next. Choose the type of item you're installing from the list that appears and left-click Next again. Choose the manufacturer and model of your device from the lists provided and left-click Next. You'll see a message saying that the device is Plug-and-Play-compatible; left-click Next again for Win95 to install the necessary software. You'll then left-click Finish. You'll get the message saying the software has been installed; you'll probably have to restart Win95 for the software to work properly.

If the manufacturer and model of your device aren't on the list and you have an installation diskette that came with the device, left-click Have Disk instead of choosing a device. Insert the diskette into the diskette drive, indicate the appropriate drive letter, and left-click OK. When the software from the diskette has been installed on your hard drive, you'll get a message to that effect. Again, restarting Win95 ensures that the new hardware settings take effect.

If none of these options works and your device came with a diskette containing a setup program specific to that device, choose Run from the Start menu, type in the name of the setup program file, and left-click OK. Follow the setup directions for the program. When you're finished, you'll need to restart Win95. ■

by Diana K. McLean



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Double-Click Speed:

Chording Speed:

Cursor Keys:

Slow Cursor: No Modifier Keys

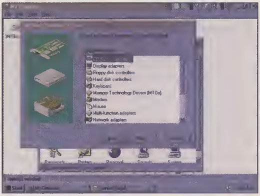
Brilliant Cursor: No Modifier Keys

Axis-Only: No Modifier Keys

Enhanced Mouse Buttons:

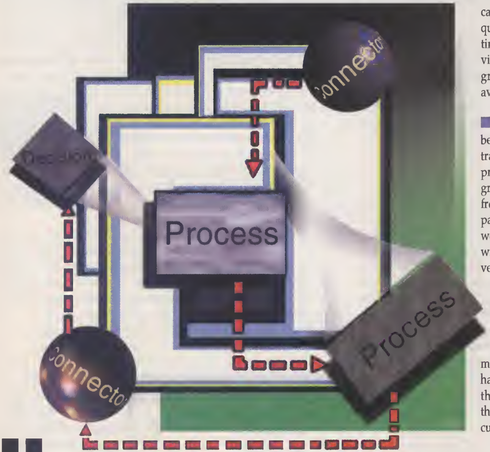
Button Press:	Response:
Right Button	Right Button
Chord	Chord
Left Button	Left Button
Middle Button	Left Button

The Control Panel software bundled with some devices can simplify configuration.



If things go well in a Windows 95 hardware installation, the device is detected and configured automatically.

Flowcharting Software Offers The Power To Explain



How do you explain the complexities of career development to dazed and confused college students?

You draw them a picture.

That was the approach Louis Shields decided to take several years ago when he noticed students seemed to be missing the point when he gave presentations about planning their future careers. Shields is director of career services at the State University of New York, College of Technology, at Delhi. The picture Shields decided to draw for his students was a flowchart.

A **flowchart** is a diagram that explains a process using different shapes connected with arrow-tipped lines. The different shapes mean different things. For example, a square usually represents some type of process, while a diamond represents a decision. To read a flowchart, you simply start with the first shape, read the text inside that shape, then follow the lines and arrows onto the next shape. If a flowchart asks a question, you follow the lines in the direction that reflects your answer. A well-assembled flowchart can explain a process more completely and concisely than a written description.

In the past, the biggest problem with flowcharts was creating them. If you wanted a personalized flowchart, you had to draw it yourself, using an old-fashioned pencil, paper, and stencil. A complex chart could be a long and tedious project, and for those people with artistic deficiencies, the end product wasn't always worth the struggle.

But flowcharts don't have to look like the scribbles of a demented 4-year-old. Today, you can buy software that helps make professional-quality flowcharts that clarify processes in no time. The programs, several of which we review later, are a cross between a drawing program and a simple word processor and are available in a variety of formats and prices.

The Power To Explain. Shields began looking for a program to help him illustrate the career development process and make presentations that were "logical, linear, and graphically sensible." He chose *FlowCharting 3* from Patton & Patton. (He now uses the company's *Flowcharting PDQ*, one of the programs we'll review later.) The first project he tackled with that original program was his career development flowchart.

The flowchart showed students how different actions could affect their futures, he says. The chart illustrates that if you are at this stage of your career, and you must face this question or circumstance, and you make this decision, then this will most likely happen. If you make a different decision, then this will most likely happen. From each of these decisions, an entirely different set of circumstances (and more decisions) can arise.

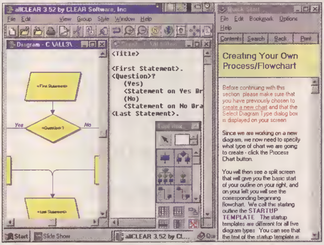
The illustration made it easier for the students to understand the essentials, to follow the process, and to grasp the overall picture, Shields says. And the software made it easier for him to do the job his way, by letting him concentrate on the process, not the act of drawing the shapes and lines.

"The software makes the process faster, more reliable, more consistent, and the end product is always more attractive," Shields says.

Once he had a handle on creating the flowcharts, he says, he soon began finding ways to use the software for other projects. Over the years, he has created flowcharts for a wide variety of processes, including charts he uses for presentations on decision-making strategies and another he uses for computer lessons on how the Internet and E-mail work.

Steve Marsden, an avionics supervisor with the Texas Air National Guard, says he has also found plenty of uses for his flowcharting software. He's used Clear Software's *allCLEAR III for Windows* on a number of big projects. The largest, so far, involved documenting the various processes for procuring services and supplies.

"If you've ever dealt with the military, you know that procuring supplies and services can be a nightmare, so we put together a book with 23 different methods for procuring these items," he says.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Creating Your Own Process/Flowchart

Before continuing with this section please make sure that you have previously chosen to create a new chart and that the Select Diagram Type dialog box is displayed on your screen

Since we are working on a new diagram, we now need to specify what type of chart we are going to create - click the Process Chart button.

You will then see a split screen that will give you the basic start of your outline on your right, and on your left you will see the corresponding beginning flowchart. We call this starting outline the STARTUP TEMPLATE. The startup templates are different for all five diagram types. You can see that the text of the startup template is

Text-minded users will find *allCLEAR III* helpful in illustrating processes that they find difficult to picture.

Each method begins with a statement that identifies the starting point of the process. It moves on to ask questions and point the reader in the correct direction for completing the job. It has made procurement easier for people by identifying the trouble spots and guiding them down the right path, he says.

"Before this, the processes were very fragmented with different policies, instructions, and checklists to consult," Marsden says. "The same questions were asked over and over. Now those questions are answered."

Marsden says he also found plenty of other uses for the software, including illustrating the procedures used in the avionics shop by breaking the jobs down into easy steps. Now, people can simply examine the flowchart if they have a question about how they should do something.

"I like to use pictures more than words, and I think others do, too," Marsden says. "It makes it easier to see the whole picture."

Teaching The Teacher. In addition to making it easier for a person to illustrate a process, flowcharting packages can offer an additional benefit to users: the ability to gain a better understanding of the process they're trying to explain.

Shields says he found that in the process of making a flowchart, he often discovered aspects of the process he was illustrating that he never knew existed. This proved to be particularly enlightening when he decided to make a flowchart of the workflow in his office and discovered ways to improve efficiency.

"When we looked at our processes in a critical way from a graphics point of view, we found ourselves asking 'Gee, do we need to do that?' and 'Why are we doing that?' " he says. "It has allowed us to move to greater levels of efficiency by recognizing that some of the steps we were taking might be redundant and unnecessary."

Marsden echoes Shields' sentiments and says when he was creating the flowcharts on procuring supplies and services, it opened his eyes to all the different people and offices involved in the process.

"It really gave us a better idea as to what people have to go through to get the job done," Marsden says.

Product Reviews. We've seen some examples of how flowcharting programs can assist users in creating detailed, professional flowcharts that help explain complex processes in simple, graphically pleasing forms. We've also seen how using such a program can bring a greater degree of clarity to the process for the person using it. Now, we'll look at three of the major flowcharting packages on the market.

FlowCharting PDQ. This package was the easiest, most intuitive, and least expensive of those we reviewed. It comes from the folks at Patton & Patton, costs $215, and is designed to run on Windows 95. (The company also offers DOS and Windows 3.x flowcharting packages.)

Putting together a flowchart in PDQ consists of simply dragging a shape from the template, placing it on the page, clicking the text manager button, typing text directly into the shape, adding another shape, and connecting the two with a line. Repeat this process several times, and you have the beginnings of a real-life flowchart.

When you're faced with the numerous shapes that appear on the template, starting the flowchart can actually be the most daunting task of all, especially if you're unfamiliar with what each shape represents. Of course, you can make your flowcharts the way you want to, with the shapes taking on whatever meaning you assign to them. But for those users who prefer to do it by the book, PDQ offers a nice little feature that tells you what each shape signifies when you place the cursor over its template icon.

Once you have the shapes, lines, and text in place, it's easy to make modifications. You can pick up an entire box and move it; the connected lines follow in an orderly fashion. You can alter the size of the shape without distorting it. You even can change lines from straight to squared path (with 90-degree angles) to curved.

This is a very simple program to operate, and we were designing good-looking flowcharts in no time. However, the program's simplicity could also be its flaw in the eyes of some users. PDQ is essentially a specialty drawing package. To use the program well, you have to know how you want your flowchart to appear. PDQ offers no maps on how it should look, so you're on your own. The program simply provides the tools, and you go from there. This package should appeal to users who tend to think in pictures, rather than those who favor a text-based thought process.

allCLEAR III for Windows. This $299 package from Clear Software offers the text-minded users we just mentioned a forum for creating their own flowcharts. This program will draw the flowchart for you, based upon your written descriptions.

It works like this: You pick what type of flowchart you want to make (a process chart, tree chart, decision chart, etc.). Then you type your text into an outline form that appears along the right side of the split screen. The program interprets that text and places it into flowchart form. The trick is that you must use specially designated punctuation and spacing to accomplish this. For example, placing a question mark at the right point in a line automatically creates a yes/no decision, whereas a colon creates a multiple-answer selection. Learning the special marks and spacing is the trickiest part of using allCLEAR.

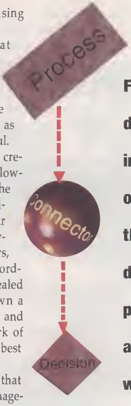
But the software helps make that learning process easier by offering a dynamite tutorial called Quick Start. We've seen a lot of help programs in a lot of software, and this one stood out from the crowd immediately as being one that was actually quite helpful.

Quick Start guides you through the creation of a number of different types of flowcharts, step-by-step, until you learn the basics. The process can be a little complicated, and frustrating, but it was clear from the start that this method of flowcharting makes a lot of sense. As writers, we here at *PC Novice* can be pretty word-oriented, and this program really appealed to that instinct. For us, breaking down a process into a text-based outline form and then letting the program do the work of plugging it into an illustration was the best way to go.

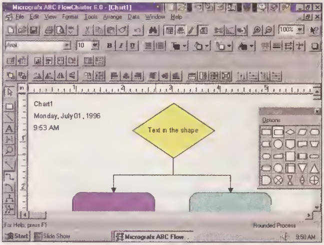
For those households or businesses that have people from both the word- and image-minded groups, allCLEAR offers the ability to create flowcharts the other way as well, using the drag-and-drop method. When you do it like this, the program automatically creates a written outline to accompany the illustration. When we used it in this manner, allCLEAR wasn't as easy to use as PDQ. But by offering both options, the package wins major points from us.

ABC FlowCharter 6.0. MicroGrafx designed this package (which is part of the *ABC Graphics Suite 95*) specifically to complement the abilities of Win95 and *Microsoft Office*. It offers a range of abilities in addition to flowcharting, including graphics design, image editing, and media management (with access to about a zillion clip-art images). The starting price for the Graphics Suite is $299, but some users may find that they qualify for the upgrade price of $149. Call Micrografx's customer service for details before you buy.

ABC Graphics Suite 95 should appeal to users looking for a total graphics package. If you're in the market for a graphics program, as well as a flowcharting package, this could be the one for you. All of the applications seemed quite capable, but we concentrated on the flowcharting package for this review.



For us, breaking down a process into a text-based outline and letting the program do the work of plugging it into an illustration was the way to go.



As part of a graphics suite, *ABC FlowCharter* 6.0 offers an abundance of features and graphics capabilities.

When you open up a new chart in *FlowCharter*, it is immediately clear this program has very close ties to Office. (In fact, you can place a button for it in your Office toolbox.) The template even looks like an Office template, with the flowcharting tools and a shape template thrown into the mix.

The typical Office user should feel right at home. Others may be a bit intimidated by the sheer number of tools and options the program offers. We fell somewhere in the middle of those two groups, but we did find ourselves thumbing through the user's manual looking for examples on how to get started.

Once we did get going, we found the program really was pretty easy to use. You simply place a shape, add the text, and connect it to another shape. There are plenty of interesting tools that help make the job easier and more professional; the trick is to learn which buttons go with which tools.

FlowCharter resembled PDQ in that you create your flowcharts using the drag-and-drop method. It was different from PDQ in that it seemed to be slightly more complicated (at least in appearance) to operate. This package should appeal to the graphics-minded Office user who wants all the additional software and who has enough experience not to be intimidated by the feature-laden interface.

We had pretty good luck with all three of the packages we reviewed. But every user is different, and we all have our own preferences. Fortunately, all three manufacturers offer interested buyers the opportunity to give their software a test run before they make the big purchase. Both FlowCharting PDQ and allCLEAR III for Windows have free downloadable demonstration versions available at their World Wide Web sites listed below. You also can try out ABC Graphics Suite by calling MicroGrafx and ordering a $10 demonstration CD-ROM. Whichever you choose, any one of these packages should have you flowcharting like a professional in no time. ■

by Tom Mainelli

For More Information:

ABC Graphics Suite 95
MicroGrafx
(800) 765-7859 (for preview CD-ROM)
(214) 234-1769
http://www.micrografx.com

allCLEAR III for Windows
Clear Software Inc.
(800) 338-1759
(617) 965-6755
http://www.clearsoft.com

FlowCharting PDQ
Patton & Patton Software Corp.
(800) 525-0082
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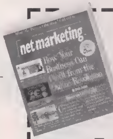

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Storage:

It's Not Just Your Hard Drive Anymore

The need for data storage is at a premium. Photo files, sound clips, and video files are becoming commonplace on the average PC, requiring users to find a place to store this space-hungry data. And as people begin to more fully utilize the Internet, downloading a video segment, utility program, or screen saver here and there, they're discovering hard drives fill up fast.

Sure, hard drive capacities are getting bigger and bigger. About five years ago, a 40 megabyte (MB, about a million bytes) hard drive was sufficient; now 1.2 gigabyte (GB, about a billion bytes) and 1.7GB drives are the most popular. But sometimes even a gigabyte isn't enough. Users crave storage alternatives for this data influx, and not just for backup.

Storage manufacturers have answered the call and in a very affordable way, with everything from magneto-optical drives and recordable CD drives to Zip drives and 120MB diskette drives. Various drives range in price from a few hundred dollars to more than $1,000, and many of the media disks and cartridges are available for prices from a few dollars to more than $100. In fact, the market for extra storage has become so great that alternative storage devices are bundled with many popular PC lines.

Fortunately, most of the drives aren't in direct competition; their data storage technologies and prices suit them better for different uses, such as emergency backup or simply data archiving. We'll introduce you to some of the more popular storage options out there. Once you are familiar with how they work, how easy or difficult they are to install, and just what type of storage they're best at, you'll be able to better decide what type of additional storage may be right for you.

A Second Hard Drive. The most convenient and fastest-accessed data is that stored on a hard drive. So why not just take the plunge and install an additional hard drive? For users struggling by with a 200MB drive, those new 2GB drives probably sound heavenly. In some ways, they are.

Whether it's a second hard drive or a hard drive replacement, a hard drive outshines every other option when it comes to retrieving your data and files quickly. And the ideas of what you can store on a new drive are limitless. Unfortunately, however, the hard drive isn't. A new hard drive can handle all those multimedia files, presentations, World Wide Web pages, and software applications that you want to store. But, even if a gigabyte sounds big, large files can gobble up that space a lot faster than you may think. Your hard drive only has so much space; if you want more space with an alternative storage device, you just buy another disk or cartridge. Also, if something should happen to your system or hard drive, you will still need a way to create a second, backup copy of your data.

We found installing a new hard drive to be a little more difficult than installing any of the other drives. There are a number of compatibility concerns that must be addressed. Can your computer accommodate a 3.5-inch drive or a 5.25-inch drive? Can your hard drive adapter card support a hard drive that's more than 1GB? (You should be able to find this in your computer or hard drive documentation.) If you're using the drive as the main drive, you will need to load your operating system on it, as well. And if you've designated a CD-ROM drive as your D: drive, a second hard drive may take that drive letter, confusing some CD-ROM programs you may have already installed.

The Quantum Bigfoot 2.5GB drive we reviewed came with *Ontrack Disk Manager* software to walk us through the installation process, after we configured the settings, positioned the drive, and connected all the cables. It was quite a task, but once we had installed the hard drive, we knew we were ready to install anything.

Prices for hard drives keep dropping, making them increasingly attractive. The Bigfoot 2.5GB internal drive sells for $359, while a 1.2GB Bigfoot drive from Quantum (800/624-5545, 408/894-4000) is about $229. The price you pay for a gigabyte of storage is appealing when you compare it to other alternatives. However, when you consider that to get even one more megabyte of storage you must purchase another entire hard drive, this route seems pretty steep. Other storage media let you purchase add-on disks in increments such as 100MB that can be transported easily to any other machine with the same type of drive. (See chart on following page.)

Zip It. Your hard drive's strength lies in its quick access to your programs. The problem is that it simply gets filled up quickly with all those large multimedia and online files. A secondary storage device could solve two problems at once, letting you keep large files without taking up precious hard drive space as well as make backup copies of your data that are safe even if your system crashes. And when you run out of room, you just plug in a new disk or cartridge.

One of the most popular removable storage drives is Iomega's Zip drive. (Iomega made a name for itself a few years ago with a removable storage technology called Bernoulli.) The company shipped more than 1 million Zip drives since June 1995 and has reached agreements with computer companies such as Hewlett-Packard, Acer, IBM, Gateway, and Packard Bell to bundle Zip drives in their PCs. Epson, a major disk drive manufacturer, is distributing its own version of the Zip drive. The Epson drive is nearly identical in technology and price to Iomega's drive, but it comes in an ivory rather than purple color.

These drives store data magnetically, in a manner similar to diskette drives. Zip drives can store more data because the medium inside a Zip disk is just a little bit bigger than that inside an ordinary diskette, and the read/write head accesses data on the disk more efficiently than a regular diskette read/write head. Although a Zip disk can't access data as quickly as a hard drive, it works fast enough to store up to 100MB of files and programs. These programs even can be run straight from the Zip disk.

It took about 15 minutes to install an external Zip drive on our PC. We found it extremely easy to set up; it simply plugged into an empty parallel port (an additional parallel port is available on the back of the unit for your printer hookup). Transferring files to the 100MB Zip disks was as easy as working with regular diskettes. You simply drag and drop files to the Zip drive icon in Windows 95. Because of the easy installation and the large amount of storage, Zip drives are great storage extensions for nontechnical users.

A variety of new storage media means users can hold up to 4.6GB of data in their hands. That's more information than most computers can hold on their hard drives.

The price is also low enough for the average user to afford. The drives from both Iomega and Epson sell for about $199, while the 100MB Zip disks cost about $15 each. Iomega (800/MY-STUFF, 801/778-1000) is using a big marketing push this year to get its Zip drives into as many consumer PCs as possible. The company hopes to make Zip drives the next storage standard before other technologies gain a foothold. As an incentive, if you buy a Zip drive by Sept. 15 from Iomega or Aug. 31 from Epson (310-787-6300) you'll receive a $50 rebate.

120MB Diskette Drives. Another promising alternative may not be far from your diskette drive. In fact, the new **LS-120** "laser servo" technology may be the technology that challenges the Zip drive. Laser servo technology, developed by Compaq, 3M, Matsushita-Kotobuki Electronics, and O. R. Technology, can place 120MB of data on a diskette.

The 120MB diskettes look just like ordinary 3.5-inch diskettes. In fact, LS-120 drives also can read and write to ordinary 3.5-inch diskettes (but will only be able to store 1.44MB on those diskettes). Laser servo uses a combination of magnetic and optical means for the greater capacity. An optical sensor precisely positions the read/write head in the diskette drive over the data tracks so the disk media is more efficiently used. Then the data is stored magnetically, just like on a regular diskette.

Because the technology is so new to the market, review units were unavailable as *PC Novice* went to press. However, Compaq bundles the drive in its ProLinea and DeskPro systems, and FD-3120A standalone drives using LS-120 technology are now available from O.R. Technology (408/441-0660) for about $210. Matsubishi Electric also expects to have LS-120 drives available later this year. The diskettes are available from 3M and Maxell for about $15. At those prices, you can get a little more storage than a Zip drive at close to the same price. And over time, as you reach 1GB of extra storage, the price of LS-120 storage per megabyte can actually become cheaper than Zip drive storage.

The Removable Hard Drive. SyQuest offers its own proprietary storage alternative called the EZFlyer 230MB drive, which isn't quite as predominant as the Zip drive. EZ drives operate differently from Zip drives. The same heads, motors, media, and electronics used in regular hard drives are used in SyQuest's removable cartridge drives, but the drives have a slightly slower access time than hard drives.

Installation of the external SyQuest drive was just as fast and easy as that of the Zip drive; it plugged directly into the parallel port. (An extra port also is available on the back of the SyQuest drives for a printer hookup.) We found the EZ cartridges also operated like big diskettes, storing large files, backing up hard drive data, and even storing and running software. As an added bonus, the SyQuest drive (800/245-CART, 510/226-4000) came with a utility bar that helps you control and format the cartridges and manage files.

It'll Cost You...

The Price Of Storage Alternatives

Drive	Cost for at least 1GB of storage	Cost to add 1MB of storage
Iomega Ditto Easy 3200 Tape Drive	$299 (price of drive and one free tape cartridge)	$40 for another 3.2GB tape cartridge; price per megabyte: $.01
Iomega Internal Jaz Drive	$399 (price of drive and one free cartridge)	$100 for another 1GB cartridge; price per megabyte: $.10
Iomega Zip Drive	$334 (price of drive, one free disk, and nine $15 disks)	$15 for another 100MB disk; price per megabyte: $.15
O.R. Technology FD-3120A LS-120 Drive	$330 (price of drive, one free disk, and eight $15 disks)	$15 for another 120MB disk; price per megabyte: $.13
Panasonic LF-1004ABK Internal PD/CD-ROM Drive	$644.95 (price of drive, one free cartridge, and one $45 cartridge)	$45 for another 650MB cartridge; price per megabyte: $.07
Philips External CDD2000 Recorder	$1,005 (price of drive, one free CD, and one $5 CD)	$5 for another 650MB CD-R disc; price per megabyte: $.008
Pinnacle Micro Apex 4.6GB Magneto-Optical Drive	$1,695 (price of drive and one free cartridge)	$199 for another 4.6GB cartridge; price per megabyte: $.04
Quantum Bigfoot 1.2GB Hard Drive	$229 (price of hard drive)	$229 for another 1.2GB drive; price per megabyte: $.19
SyQuest EZFlyer230	$418.80 (price of drive, one free cartridge, and four $29.95 cartridges)	$29.95 for another 230MB cartridge; price per megabyte: $.13
SyQuest SyJet 1.3GB	$499 (price of drive and one free cartridge)	$99.95 for another 1.3GBcartridge; price per megabyte: $.08

The EZFlyer drive costs $299, and 230MB cartridges are available for $29.95. While it costs more for 1GB of storage when compared to the Zip drive, the EZFlyer drive will save you several cents per megabyte down the line. (See chart.)

If your storage needs involve files or programs that require more than 230MB, SyQuest recently introduced a larger storage alternative, called the SyJet 1.3GB. The $499 drive uses 1.3GB removable cartridges, which cost about $99.95.

Iomega also introduced its own "mega" removable storage alternative, called the Jaz drive. For $499 for an external drive and $399 for an internal drive, you can store data with hard drive-like technology on 1GB cartridges. Jaz, with cartridges priced at only $100 apiece, ends up costing a little more than SyJet for a little less storage. The initial cost of the Jaz and SyJet drives may scare off some consumers, but these two products are marketed more as hard drive extensions and for large file archiving to users that may deal with very large graphics and video files, rather than as primary storage options.

CD-Recordable. Not all storage alternatives are magnetic; some take advantage of laser optics. Take, for instance, compact discs. CDs are no longer just **ROM**, or **read-only memory**, in which you can read data from the discs but not record on them. **CD-Recordable** drives let users create their own CDs, using special CD-R discs coated with a blue/green dye polymer. The laser inside the CD-R drive changes the dye to create the reflected areas and nonreflected areas, or ons and offs, that you have in digital data. However, once you write information to the dye, it stays that way. CD-R discs only can be recorded to once and are the only type of media reviewed here that you can't rewrite.

The downside of CD-R is that the drives are still pretty pricey. While most cost around $1,000, there are some as low as $600. The

ADVERTISEMENT

Does Your PC Have A Mind Of Its Own? Here's How You Can Take Control...

BY CLARK PARKER

If you're like me, you probably look at your computer with equal parts awe and incomprehension.

Sure, the possibilities seem limitless, but it sometimes seems as if just switching your PC on requires advanced education. You can read the operating manual, but more often than not it seems to have been translated from Japanese to English by someone who knows only Swahili.

Go to your local bookstore, and you'll find hundreds of books — all written for somebody else's software. Of course, most computer manufacturers offer telephone helplines as a solution...if you don't mind sitting on hold for forty minutes and then forgetting the question you meant to ask, that is.

International Correspondence Schools of Scranton, Pennsylvania has developed another option. It's called *distance education*, and for thousands of men and women around the world it's become the best way to learn the intricacies of computer hardware and software without having to go to class.

The way distance education works is simple. You enroll in the program that best suits your needs — anything from Desktop Publishing to an Associate in Specialized Business Degree in Applied Computer Science. Once you enroll, the school sends your instructional materials to your home or office. You get lessons, books, software—whatever you need to complete your program. Lessons are presented step by step, and most programs can be completed in less than a year. A Degree takes a little longer, but you can still come away with a four-semester Degree in as little as two years.

What most people like best about distance education is its convenience. Unlike a college class, you have complete control over when, where, and how long you study. There's no time spent traveling to and from class, and your "class schedule" is as flexible as you are. Plus there's no waiting for other students to catch up or wishing the instructor would slow down. You move at your own pace. Exams are given on an open-book basis, which means you can be sure you've mastered the concepts rather than memorized the answers.

The programs are usually designed to provide students with the expertise to enter or advance in computer careers. In fact, thousands of students have used their training to secure promotions, pay raises, and even start whole new lives in computer career fields from Programming to PC Repair. And even if you just want to master the PC for your own enrichment and enjoyment, you can be confident that each training program provides up-to-date and comprehensive instruction.

All the information is presented so that even students who don't know a floppy disk from a soggy pizza can easily absorb every detail. Beginners love distance education because everything is presented in a logical, step-by-step format. There's no confusing "techno-speak," and you get plenty of hands-on experience. And even though programs are easy to understand and complete, they're so informative that even computer experts will learn something (and usually *several* somethings) they didn't know before.

But just because you study at home, on your own schedule, doesn't mean you're alone. ICS, for instance, has a large support staff at their headquarters, including expert instructors who are available to answer questions by toll-free helpline, as well as via the ICS site on the world wide web (http://www.icslearn.com).

Of course, ICS isn't the only distance education school out there, though it is the largest and most experienced in the world. You should compare ICS with other programs to make sure you get instruction that's right for you. The following chart shows a few of the differences between ICS and its leading competitor:

HOMESCHOOL CHECKLIST	ICS	Leading Competitor
Students Enrolled	**250,000**	55,000
Total Programs Available	**62**	30
Number of College Degree Programs	**11**	None
24-Hour Student Helpline	**Yes**	No
Payment Plan Available	**Yes**	Yes
Finance Charges on Payment Plan	**None (0%)**	8%

ICS currently offers Career Diploma Programs in such computer specialties as: Computer Programming in QuickBASIC, Visual Basic, Visual C++, Personal Computer Specialist, PC Repair, A+ Certification Test Prep.*, Desktop Publishing & Design, Computer-Assisted Bookkeeping, Small Business Management, and Personal Computer Fundamentals*. You can also get your High School Diploma through ICS, or choose a Career Diploma program in a non-computer career field, like Electrician, Medical Office Assistant, Dental Assistant, Professional Locksmithing, TV/VCR Repair, Legal Assistant, and Appliance Repair. You can even earn an Associate in Specialized Business Degree by choosing Applied Computer Science, Accounting, or Business Management. Get an Associate in Specialized Technology Degree in Electrical Engineering Technology or Mechanical Engineering Technology. Every ICS Degree Program offers computer training.

* For personal enrichment only

FOR MORE INFORMATION, you can contact ICS directly by calling toll free **1-800-595-5505, Ext. 1836** Write to International Correspondence Schools at Dept. AA5S96S, 925 Oak Street, Scranton, PA 18515 or contact ICS at http://www.icslearn.com

The school will send you FREE information and a color brochure about the training program you're most interested in. There's no obligation, so contact ICS today!

812XD

actual CD-R discs are cheap—about $5 each. Also, the drives available today are pretty slow. Most record and read information at double-speed (2X) or quad-speed (4X), which is much slower than the 6X, 8X, and 10X CD-ROM drives now available. In fact, it can take 20 minutes to an hour to record about 650MB of data, depending upon the authoring software used to save data (a lite version is usually available with the drive) and the drive itself.

Storing information with CD-R is getting easier. In some cases, for instance with Sony's new **CDRFS**, or **compact-disc recordable file system**, CD-R discs can act a lot like 650MB diskettes. In Win95, you just drag and drop files from the hard drive folder to the CD drive folder. (CDRFS is available in Corel's authoring software and Sony's Spressa drives.) Setting up the drive we received from Philips wasn't too difficult. The Philips External CDD2000 Recorder (800/235-7373) required installation of an internal **SCSI** card, and we had a little trouble coordinating all our SCSI devices, but no trouble from the drive itself. (Small Computer System Interface, or SCSI, is a type of interface used to connect computers to peripherals, other computers, and networks.)

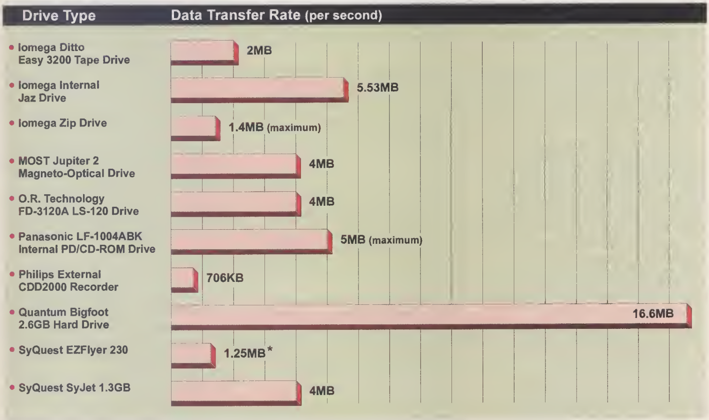
CD-R discs are widely accepted. Not only can you play or record any brand of CD-R disc in any brand of CD-R drive, you also can read data off a CD-R disc in a CD-ROM drive and eventually in **CD-Erasable** drives, when they become available late this year. (CD-E drives, also known as CD-Rewritable drives, let users record data on CD-E discs many times, compared to CD-R discs that can only be written to once.)

Because CD-R discs can store so much data (about 650MB) and because they are so widely accepted (anyone with a CD-ROM drive can read data from one), they have numerous uses. They're great for storing large multimedia files and for creating multimedia scrapbooks, photo albums, or presentations. They're also great if you want to download a whole Web page, graphics and all, off the Internet or keep a copy of a utility you may want to use someday. And because CD-R discs can be used by anyone that has a CD-ROM drive, you can place brochures, multimedia presentations, computer-based training, or other materials on the discs to distribute. Compared to other drives that require you use only their media on their brand-name drives, this is a big plus.

■ **PD/CD Drives.** Of course, if you don't want to wait until CD-E drives are available to be able to rewrite data with your CD drive, Matsushita Electric's Panasonic Computer Peripheral Co. has developed a CD-ROM drive with a twist. Called **PD/CD-ROM**, these drives let users operate ordinary CD-ROMs, as well as read, write, and rewrite to 650MB optical cartridges.

While one portion of the drive reads data from a CD-ROM just like an ordinary CD-ROM drive, another portion utilizes **phase change technology** to work with the cartridges. Phase change is a completely optical technology; it uses a laser beam to heat the cartridge media and change the reflectivity in some areas, creating the ons and offs of digital data.

We looked at the Panasonic LF-1004ABK internal PD/CD-ROM drive (800/742-8086 ext. PD, 201/348-7000). For about $600, it can read CD-ROMs at 4X speed as well as the 650MB optical cartridges. (Another internal model is also available for $499.95.) Because it was an



Storage Speeds

* (parallel port unit), 1.4MB to 2.4MB (SCSI unit)

internal unit, we had to adjust the drive to work with other SCSI devices, but the installation was relatively easy (although the installation instructions left a lot to be desired) and took about half an hour. We set up the D: drive to work with the optical cartridges, while the F: drive was used for CD-ROMs. We stored all kinds of files and a few programs on the removable cartridge, which looks like a 3.5-inch diskette but is about the size of a 5.25-inch diskette. When we attempted to run the programs directly from the cartridge, there was a noticeable lag time while the computer retrieved the data from the cartridge.

Again, this type of media is proprietary, so you can exchange cartridges only with other PD/CD-ROM users. But it offers another alternative for backing up your hard drive, storing large multimedia and Internet files, or archiving data.

PD/CD-ROM drives also are available from companies such as Smart and Friendly Computer Products, Plasmon Data Systems, and Toray Optical Storage. They're also bundled in certain Compaq Presario and Pentium Pro computers, and NEC and Zenith Data Systems are marketing systems with the drives. Cartridges are available for $45 to $60.

Magneto-Optical Drives. If you're in the habit of storing lots of very large graphical or multimedia files—maybe you're in the publishing or video business—you may want to save your money to get a **magneto-optical**, or **MO**, drive. These drives have many uses, from data backup to archiving, but they're best known for their large storage capacities.

Magneto-optical drives use removable cartridges with capacities of 230MB to 4.6GB. Data is written to the media using a laser beam, like most optical methods. However, the disk's media has a magnetic layer that is changed by the laser beam to form ons and

Pros And Cons

Storage Medium	Pros	Cons
CD-R Drive	—Because of large 650MB capacity, is ideal for storing, archiving, or backing up large files —Excellent medium for distributing data, as can be read by both CD-ROM systems and CD-R drives —Cheap price per megabyte of discs	—Are not rewriteable —Drive cost is still expensive —Transferring files is not as easy as drag-and-drop on some —Slow transfer rate
Hard Drive	—Fast access to data —The practical choice for storing any type of file or program because of fast access time	—Once out of storage, you must buy entirely new unit rather than inexpensive cartridges —Price per megabyte is high
Jaz Drive	—Ideal for large file storage, data archiving, and backup because of the 1GB removable cartridge capacity	—Price of disks the same as SyJet disks for a little less storage —Proprietary cartridges can only be used in Jaz drives
Magneto-Optical Drive	—Huge amounts of storage for large files, data archiving, and backup; can store up to 4.6GB on some removable MO cartridges	—High start-up price for drives
O.R. Technology	—As easy to store files on as a diskette, but with lots more room (120MB) —Can read and store (1.44MB of data) on ordinary 3.5-inch diskettes —Faster data transfer rate than Zip disks	—Not as prevalent in PC market —120MB disks can't be fully accessed in ordinary 3.5-inch diskette drives
PD/CD-ROM Drive	—Can read and write to PD cartridges, as well as read from CD-ROM discs —Good cost per megabyte for 650MB of storage —Because of large 650MB capacity, is ideal for storing, archiving, or backing up programs and less-used programs (has noticeable lag time when running program from CD)	—PD cartridges are proprietary, so are only used in PD drives
SyQuest EZFlyer	—As easy to store files on as a diskette, but with lots more room (230MB) —Can store and run your less-used programs (transfer rate causes some lag when program operates) —Good cost per megabyte for 1.3GB cartridges	—Proprietary cartridges can only be used in EZ drives
SyQuest SyJet 1.3GB	—Ideal for large file storage, data archiving, and backup because of the 1.3GB removable cartridge capacity	—Proprietary cartridges can only be used in SyJet drives
Tape Drive	—Cheap cost per megabyte of storage	—Only ideal for backup purposes
Zip Drive	—As easy to store files on as a diskette, but with lots more room (100MB) —Can store and run your less-used programs (transfer rate causes some lag when program operates) —Cheap drive price; $50 rebate through Sept. 15	—Proprietary disks can only be used in Zip drives —Price of disks the same as LS-1200 disks for a little less storage

offs. Because of its magnetic qualities, this type of optical storage is rewritable.

We looked at the Mass Optical Storage Technologies (MOST) Jupiter 1 magneto-optical drive, which can handle cartridges with up to 2.6GB capacity. Although the external drive called for little more than plugging in a few cords and installing the software, it required the use of a SCSI card with a special port on the back that must be installed inside the system. The size of the drive gives a little indication of the huge amount of data it can store. (It was about two to three times the size of the other external drives.)

Most consumers will find magneto-optical drives out of their price ranges. For instance, the drive we looked at from MOST (714/898-9400) has a price tag of about $2,440, while cartridges cost around $129. An even bigger drive from Pinnacle Micro (714/789-3000) with a more affordable price, the Apex optical hard drive, can store about 4.6GB for $1,695, while cartridges cost about $199 apiece.

Tape Drives. If all you want to do is back up your data, the simple answer is a tape drive. While hard drives and other storage mediums magnetically store data on round record-like platters, tape drives store data on magnetic tape, kind of like audio cassettes. Most consumers are interested in **minicartridge** tape drives, which are about the size of a deck of cards, because of their price. Minicartridges are available in many sizes, from a couple of hundred megabytes to a couple of gigabytes. Because of the time it takes to store data and the medium used, you only will want to use a tape drive to make a backup copy of your data for emergencies—not for primary data storage.

We tested a Ditto Easy tape drive from Iomega, although you can find minicartridge drives from other manufacturers, such as Conner Peripherals, Teac America, and Colorado Memory Systems (a division of Hewlett-Packard). The 3M tape cartridge we used was capable of storing 3.2GB of compressed data and used a technology called **Travan** to more efficiently store data on the tape. Because we installed an external unit that plugged into a parallel port, it took about 15 minutes to get everything set up and running.

Backing up data to a tape drive is not quite as easy as dragging and dropping files to copy them over to the tape cartridge. You need the built-in software to assist you. The software also lets you schedule when to back up the entire drive, back up supplements of new data, or selectively pick and choose what to back up. We discovered that hard drives and other storage media are relatively silent when compared to the tape drive, which makes a variety of grinding noises as it operates. Also, it takes quite a chunk of time to back up your entire hard drive. It took well over an hour and 15 minutes to back up 200MB of data with the Ditto drive and then go back and verify it. Of course, all this takes place in the background as you work. When we wanted to check the progress, we were able to double-click a minimized icon to see how much time was left and how much of the tape cartridge had been used.

Panasonic's PD/CD-ROM drive stores large amounts of data optically, even on cartridges.

Prices of tape drives are getting really cheap. Of course, they have to be in order to compete with other types of storage that can not only back up data but also let you easily store and retrieve big files and programs. The Iomega Ditto 3200 drive we tested cost about $299, while cartridges cost about $40.

The Future Of Storage. Although much of the industry talk is about the battle in the Internet market, there's a war raging in the storage world that's just as big. Storage companies have built marketing campaigns to get their drives, many of which are proprietary, in consumer computers. The more people that have the drives and can exchange data, the more popular the drives will become.

The one slight exception to the proprietary rule is CD-R. According to a recent study by the Software Publishers Association, 83% of all PCs purchased in 1995 were equipped with CD-ROM drives. Each CD-R disc made in CD-R drives can be read in CD-ROM drives. And as we mentioned earlier, they also will be compatible with CD-E drives, a technology expected out late this year. CD-R technology may become the storage of choice for some users as the prices of drives are expected to hit $500 late this year.

Another threat to the storage alternatives world is how fast hard drives are increasing in size and how cheaply they are doing it. According to the 1996 Disk/Trend Report by Disk/Trend, by 1999, drives in the 5GB to 10GB range are projected to outsell all other types of hard drives. That's a lot of storage.

Finally, one of the biggest shadows looming over all types of data storage is **Digital Video Disc**, or **DVD**, technology. Expected out late this year or early next year, these discs will hold 4.7GB to 17GB of information. That's enough room to store a full-length movie or all of Beethoven's symphonies on one disc. And experts predict that DVD-ROM players will be introduced at close to $500. The one hang-up that may save other storage devices is that not many DVD titles are expected to be immediately available; and when they are, they may be only movies. That $500 might be too much to expect consumers to pay just to play movies. But watch out as new software titles are introduced and drive prices drop even more. Perhaps then, our storage choices won't be so numerous or so difficult. ■

by Cindy Krushenisky

Iomega is pushing to position its Zip drives as the storage standard before optical-based technologies become more affordable.

Writing Contest Results

Number 2 Writing Contest Winner!

In March we asked you to send us a letter telling us about yourself, how and where you learned about ***PC Novice***, why you subscribed, and why you would recommend ***PC Novice***. We featured the first winner in June, and now we would like to present our second winner:

New Tricks for an old Dog

James L. Arimond, from Milwaukee, WI

"I need new glasses! I can barely read this letter," I muttered to myself over my clutter.

"You need a typewriter ribbon," Toni mumbled as she passed my desk. "Don't be so cheap. Buy a new ribbon."

I opened my "catch all" drawer and rummaged among my twenty-year collection of treasures. Unhappily, I discovered a straight pin sticking out of my right index finger, but no ribbon. I faintly remembered doing this search last month with the same results: no ribbon. Surrendering to defeat, I opened my Smith Corona portable, hoping that exposure to the light might somehow bring it new life, like an anemic plant. It was sad. The ribbon had a streak of gray through its middle like my hair. We were both suffering from the same reality: age.

"A memo to self: buy new ribbon!"

After work, with my memo clinched tightly in hand, I headed for the stationery store two blocks away.

"Sorry, we don't carry that ribbon. Everyone's using a computer. We have some ribbons for electric typewriters, but no cloth ribbons." The shy, young salesman had a bit of a smirk on his face. "I can order it for you. It should be here in a couple of weeks."

I could hardly believe it. I purchased a box of ribbons at this store what . . . six, seven years ago? I ordered a box.

"Use my computer, " Toni said the next morning. "I've got an all-morning staff meeting. Just type "WP" at the C prompt," she said as she breezed past my desk toward the conference room.

Sitting in her chair, I suspected that a day like this might come, but being between 55 and death, I had hoped that I might become a retired writer before I was forced to confront this new, frightening machine they call a "computer."

With shaky fingers I typed "WP" and stared at the screen, waiting for something to happen. Nothing did! Looking down at the keyboard, I spotted a key that said ENTER.

continued on next page

You can find our third winner HERE within the next couple of months!

Tired of loaning your issues to friends who need computer help? Here's an opportunity to introduce a friend, family member, or co-worker to **PC Novice** magazine...

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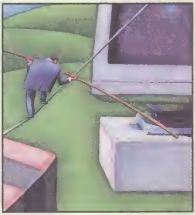
7330

Personal Message:

With my right hand poised near the On/Off switch, just in case, I hit ENTER. The box under the screen softly clicked, squeaked, and whirred. Suddenly the screen flashed to life. Things appeared and disappeared until I was finally left with a big empty box surrounded by lots of little boxes that had strange symbols in them. One tiny, vertical line kept winking at me. It looked harmless enough, so I resumed breathing and typed a few words.



As the words flowed silently onto the screen, I discovered all kinds of cute little keys like backspace, END, PAGE UP, HOME, and DELETE. Toni returned to retrieve a folder she needed and showed me how to block and move text. Then she handed me a *Teach Yourself WordPerfect* book.

With help from the book and trial and error, I finished my article, hit print, and returned, in awe, to my desk.

All afternoon I was haunted by that cream-colored wonder on Toni's desk. My gray Smith Corona stared at me, and , as the afternoon waned, I slowly began to realize, rather sadly, that our long relationship was over.

After work I asked Toni if I could play with her computer for a while. She smiled and nodded. By ten that evening I was hooked, and visions of cream-colored sugar-plum-computers danced through my head as I slept.

Toni, with her infamous sixth sense, handed me six back issues of *PC Novice* as I passed her desk on Friday morning. "I want them back," she said, "but you can read them over the weekend."

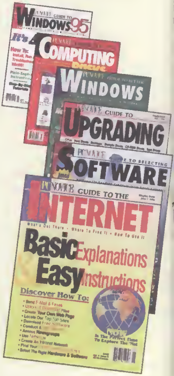
Monday evening, loaded with information from *PC Novice* articles on DOS, Windows, CPUs, CD-ROM, RAM, hard drives, bits and bytes, and "How Much Computer Do You Need?" I walked into a computer store and made my first purchase. My second purchase was a two-year subscription to *PC Novice* magazine.

For the past two years, I have not been disappointed by either. In fact, I am now one of the people to whom the younger members of our staff come when they need help in finding a directory, installing a program, or when things suddenly disappear off their screens.

I may still be, and perhaps always will be, a PC novice, but with *PC Novice*, I often feel like an expert. That's a great feeling when you're between 55 and death!

James L. Arimond
Milwaukee, WI

Congratulations James!
Your essay was great!
We hope you enjoy
your six "Guide-To"
series issues and your
new *PC Novice* T-shirt.



Don't forget to check in this place for another great essay within the next two months.

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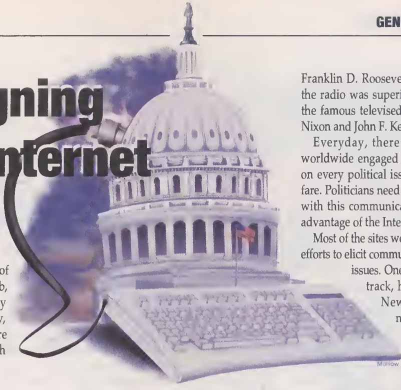
Campaigning On The Internet



Murrow

Like the business world, every level of politics has embraced the technology of computers and used it to make day-to-day operations faster and easier. With the advent of the Internet and the World Wide Web, government officials have tried to stay "with it" by going online. Unfortunately, most of their initial online efforts are little more than token Web sites with standard graphics and text.

GoverNet? In this election year, almost all the candidates have Web pages promoting their campaigns. Some have likened this technology to elections in the 1950s when television was just beginning to demonstrate the massive influence it would hold in the future of politics. But just as many of those past politicians were slow to realize the importance of TV, most contemporary campaigns fail to utilize the Internet to its fullest capabilities.

We were unable to find an official site for President Clinton's campaign, but the White House has its own site that displays the president's political activities. Its site (http://www.whitehouse.gov) features a database of White House documents and speeches and lists the accomplishments of the president and vice president.

The site also provides history and tours of the White House, an Interactive Citizen's handbook (providing information and links about government services), a section for kids (guided by the Clintons' cat Socks), and the E-mail addresses of the president, first lady, or vice president. (See the sidebar "Sending E-mail To Elected Officials" for more details.)

But apart from autoresponsive answers to E-mail, this site has no way to actually get voters involved. The dry, condescending approach of the site makes it seem more like a documentary than an invitation to participate.

Republican presidential candidate Bob Dole's campaign site is more inviting but still not that impressive. It does provide some form of interactivity for browsers, including a trivia quiz about Dole's life, downloadable screen savers and wallpaper for your desktop, and the ability to make customized posters and personalized E-mail postcards.

It also lets users subscribe to a **mailing list** (E-mail messages sent to everyone who belongs to the list) that provides campaign updates and has a map of the United States telling voters who in their state is supporting Dole's campaign. This section also boasts that it will provide information on how to get involved locally, but all it does is provide the address and phone number of the campaign headquarters in Washington, D.C., or the campaign's local address and phone number if your state has an office.

Both major candidates claim to be taking part in the communication advantages that the Internet offers, but neither one really uses it as a new medium. According to Mark Bonchek, director of the MIT Political Participation Project, in his Web-published column "It's About Community, Stupid!," politicians need to move past the old ways of campaigning.

"Candidates think the Internet is television," he writes. "The Internet is not television any more than television is print. Whereas television creates an audience, the Internet creates community. Television broadcasts a single message to large groups of people. The Internet facilitates communication within and among groups. No other medium provides the same opportunity for such immediate interaction, collaboration, and participation."

Bonchek says politicians who have capitalized on the differences between new media and old media have been successful throughout history, citing as examples Franklin D. Roosevelt's early realization that the radio was superior to the newspaper and the famous televised debate between Richard Nixon and John F. Kennedy.

Everyday, there are millions of people worldwide engaged in debate and discussion on every political issue from abortion to welfare. Politicians need to become more involved with this communication to successfully take advantage of the Internet, Bonchek says.

Most of the sites we visited were slow in their efforts to elicit communication and discussion of issues. One site that was on the right track, however, was that of the New Party (http://www.newparty.org). This party is a grassroots group working toward democratic reform, raising the minimum wage, and investing in public education and children, says Adam Glickman, communications director for the party.

The New Party is just that—fairly new. It's only been around for three years and is using the Internet to get word out about its political ideals. The party distributes mailing lists to stimulate interest in the organization and is planning for the future online.

"We want to expand our mailing lists to reach more people," Glickman says. "And we want to set up a few conferences on various issues by creating dialogue in newsgroups."

From the conservative side of the spectrum comes The Right Side of the Web (http://www.clark.net/pub/jeffd/index.html). Not an official site for any party, this site embodies conservative viewpoints and Internet potential. It features the standard graphics and text information, with both serious and humorous pages. It also includes an automatic sign-up for the Right Side's mailing list and contains links to their newsgroup.

Where this site gets innovative is in its efforts in **IRC**. (IRC [Internet relay chat] provides real-time communication over an Internet connection.) The Right Side schedules chats on its IRC server (rightside.clark.net) and is also trying out a chat room for Java-enabled browsers on the page. (Java is a programming language that allows short programs called applets to be downloaded onto a Web page and run there.)

Putting The Web To Good Use. Many nonpartisan groups are quick to seize hold of the communication and involvement abilities of the Internet. There are some skeletal sites with only a few graphics and a couple of links to similar sites. But some, such as PoliticsNow (http://www.politicsnow.com) and Vote Smart Web (http://www.vote-smart.org), are amazingly extensive and involving.

PoliticsNow, a merger of PoliticsUSA and Election Line, has an inclusive site that provides real-time political news and election results from sources such as *Newsweek* and *The Washington Post*. It gives users critical examinations of politicians with Check The Record, a page that details how members of Congress are representing their citizens. And it gives people an opportunity to get involved by providing forum rooms to hold political discussions with others.

Vote Smart Web is just as elaborate, if not more so. An online extension of Project Vote Smart, a private, nonprofit organization designed to educate Americans about politics and their politicians, Vote Smart Web is "a one-stop shopping center for government and politics," Adelaide Elm says. Elm, director of public information and a founding board member of Project Vote Smart, says Vote Smart has been on the Web for more than a year but originated in 1988.

"A number of citizens, former public servants, and former candidates got together and talked about why it was that we felt like idiots when we went to the polls," she says. "We were bombarded by a lot of meaningless hype and negative campaigning and mudslinging; we felt used in a way."

Elm says the group asked itself what one element would help citizens vote smarter. "It's information—information that we can trust," she says.

Reliable information for someone from any political affiliation has remained important to Vote Smart. "We have a founding board that's completely balanced across the political spectrum," Elm says. "We have Carter *and* Ford. We have Barry Goldwater *and* George McGovern. We also limit our funding entirely to individual contributions and foundation grants."

The Web site gives the group a new medium to present information and get people involved. It has online copies of the National Political Awareness Tests, which are broad-based issues questionnaires that are given to each candidate. On Vote Smart's page for each candidate, the results of their test are posted. "They're sort of a job interview for candidates. We ask them, 'How are you going to handle this job if we hire you?' " Elm says.

Vote Smart Web's participation page gives browsers links to sites where they have the opportunity to express their opinions on presidential candidates and political issues, openly discuss politics on the Web and in newsgroups, and interact with programs and simulators.

Getting Involved. One useful site for voter participation is the "Zipper" (http://www.voxpop.org/zipper) at Vox Pop's site, which tells you who your senators and representatives are by using your ZIP code. It also gives you their phone and fax numbers, mailing address, and E-mail address if they have one.

After you know who the candidates are in your area, you can use the World's Smallest Political Quiz (http://www.self-gov.org/quiz.html) at the Advocates for Self-Government's site to determine your political leanings. The quiz asks who you support for president in 1996 and also asks you to respond to 10 short questions about personal and economic issues. The quiz then tells you where you fall in the political spectrum, from authoritarian to libertarian.

If similar labels aren't good enough for you, you might want to "Rate Your Rep" at Congressional Quarterly's American Voter '96 site (http://voter96.cqalert.com). You fill out a questionnaire that deals with contemporary political issues, and the database checks to see how your representative responded to the same issues. There are several pages similar to this one, including the Candidate Rate-O-Matic II at AllPolitics site (http://pathfinder.com/AllPolitics/Rate-O-Matic/index.html) and Find your "Dream Candidate" from *U.S. News and World Report* (http://www.usnews.com/usnews/wash/picpoll.htm).

From voter education to online campaigning, it's obvious that the Internet will play a powerful role in the political future. It may not be present at this year's election, but it will be soon. One can easily imagine open debates between candidates in chat rooms, virtual conventions, and online voting. The Internet will get us there, but how long will it take and who will lead the way? ■

by Joel Strauch

For More Information:

Project Vote Smart
(800) 622-7627
(503) 754-2746
http://www.vote-smart.org

Sending E-mail To Elected Officials

It no longer costs 32 cents to get a form letter back from the president of the United States. Now you can get one via E-mail for free.

There are three addresses at the White House that garner an automatic response from the appropriate director of correspondence:

President@WhiteHouse.gov
First.Lady@WhiteHouse.gov
Vice.President@WhiteHouse.gov

The E-mail messages are read by correspondence staff, and a representative sampling of any suggestions is taken to the president, the first lady, or the vice president. We sent an electronic message to all three addresses and asked for any comments they might have for this article. We got different autoresponses from all three.

President Clinton's response, from Presidential E-mail Director Stephen K. Horn, included a paragraph that ensured the message's authenticity: "This is the only electronic message you will receive from whitehouse.gov. No other message purporting to be from the President or his staff with an address at whitehouse.gov is authentic. If you have received such a message, you have been spoofed." In spite of this message, we did receive autoresponses from the vice president and the first lady.

You might have better luck receiving a "live" response from a congressional representative. Juan Cabanela's Web page, Contacting The 104th Congress (http://ast1.spa.umn.edu/juan/congress.html), should give you all the information you need to send E-mail to, or at least fax or call, your senator or representative. ☐

Why *Good* Hard Drives Go BAD

—Or Do They?

It's difficult to be a small player in a big production, constantly toiling in the background while someone else gets all the credit. Your hard drive suffers this fate as one of those out-of-sight accessories in the big PC production. Can all its work storing and retrieving data for little glory make your hard drive suddenly turn bad?

Hard drives are physically reliable most of the time. Just because your computer is experiencing a problem storing files doesn't necessarily mean that the **hard drive**, a large-capacity storage medium, has turned on you. The problem, in fact, may have nothing to do with the hard drive at all.

How can you tell what's at fault? It's a tricky task that's not easily resolved. Here we offer insight into what can cause storage problems and how to begin to fix them. But before you can understand what can go wrong, you have to understand how data is stored.

Inside The Black Box. The inside of a hard drive has a remarkable resemblance to a record player. (See the diagram on the following page.) Inside are round, highly polished **platters** made of aluminum alloy, usually 3.5 inches or 5.25 inches in diameter. While some consumer drives only use one platter, others may use two to four stacked platters. Under closer scrutiny, you can see that the platters are divided into **tracks** that run in concentric circles from the outer edge of the platters to the inner edge, similar to a record album. To make it easier for the hard drive to locate information, the tracks are further divided into **sectors**. (See chart on following page.)

Once you turn the power on, these platters constantly spin; a **spindle motor** makes sure of that. The platters rotate quickly, at speeds of 3,600 to 7,200 revolutions per minute (RPM).

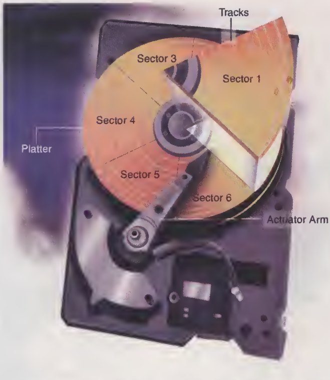
On each side of the platters, **drive actuator arms** hang out over the platters somewhat like arms in record players. At the tips of the arms are **read/write heads** that can both retrieve and store data. The heads don't actually make contact with the platters in most hard drives. Because the platters spin so rapidly, the heads fly over the surface on a cushion of air. The distance between the head and the platter is very narrow, about 1 to 2 microinches (millionths of an inch). That's pretty thin when you consider a human hair can be 10 microinches thick, and a dust particle can measure about 4 to 8 microinches in diameter, says Kevin Perry, manager of product marketing at Seagate Technology. (See chart on pg. 35.)

To store information on the platters, the computer sends data to a circuit board that connects to the hard drive through a cable. This circuit board controls the electronic flow of data in and out of the hard drive. It instructs the hard drive to send an electric current through the read/write head, which then places the **binary data** in the magnetic coating on the platter's surface. (Computers interpret information digitally in binary code of ons and offs or 0s and 1s. Eight binary numbers make one **byte**, or one character.)

To retrieve data, the read/write head travels back to that area and scans for the magnetic signals written on the platter. But how does the read/write head know where to go to store or retrieve information? That's actually part of the operating system's job.

Before you can begin using a new hard drive, you must install the operating system and **format** the hard drive. Joel Mattox, senior product manager at Quantum, says formatting is the operating system's way of creating sign posts on the drive. Then it creates a **file allocation table (FAT)**, which is like an index that keeps track of where specific data is stored. The size and structure of the file allocation table are determined by your operating system.

When you command a computer to retrieve a file, it checks with the file allocation table, discovers where the data is stored, and tells the read/write head (via the circuit board) to follow the sign posts to locate and retrieve the data. This all happens so quickly that it goes almost unnoticed by the average user. (The only sign may be a blinking light on the front of the computer.)



Dividing a hard drive's platters into tracks and sectors makes it easier for the actuator arm and its read/write heads to locate data quickly.

Break Down. It goes unnoticed, that is, until something goes wrong. You might think your data is safely locked away inside that sealed hard drive when you give the Save command. But small glitches can thwart the process.

Many times, a problem is caused by the operating system and occurs when the information is stored and indexed on the file allocation table.

Perhaps you were in a hurry and turned off the PC before an application program or Microsoft Windows was finished closing. This can cause the operating system to think you have a different storage setup on your hard drive than what it has and can result in **cross-linked files**, which means more than one file is allocated to the same area, or **bad sectors**, which are areas on the platters that can't be used, Quantum's Mattox says. (Most hard drives and operating systems today, however, take care of these bad sectors "on the fly" as they happen, reallocating the data on the bad sectors to other areas that have been reserved for just such occasions, without the user experiencing any error messages or problems.)

A problem may mean one of the mechanical motors in your hard drive has simply worn out. Manufacturers generally estimate a five-year life span for today's hard drives, but many hard drives last much longer. Besides, in five years, hard drives can become obsolete. Consider that five years ago we were looking forward to 386 megahertz (MHz) microprocessors, and 40 **megabyte** (**MB**) hard drives were all the rage. Today, Pentium (586) microprocessors and one to two **gigabyte** (**GB**) hard drives are the standard. (A megabyte is about one million bytes of data, and a gigabyte is about one billion bytes.)

Then again, the hard drive may be physically damaged. You may have zapped the drive with static electricity and blown its circuitry if you didn't ground yourself before touching the drive case while working inside the PC. A large volt of electricity also may have reached the drive through the power cables. Maybe you jarred the hard drive or dropped it. Or, perhaps you've committed the ultimate faux pas and opened the hard drive case to look at the inner workings. This introduces dust and other particles into the drive that can contaminate it and get in the way of the read/write heads.

Head Crash Mythology. Of course, you may have experienced an infamous head crash. Many people are quick to blame hard drive problems on head crashes, Seagate's Perry says, but most users have no idea what a head crash actually is. The term is used so often that it has become a catch-all phrase for any kind of hard drive problem. Head crashes, however, are now very rare.

A **head crash** happens when the read/write head makes contact with the surface of the platter where data is stored instead of the position on the platter's surface where the head can safely **park**. (In early drives, the user actually had to utilize a PARK command to set the heads down safely before turning off the power.)

The "head crash" terminology originated years ago when hard drives were about the size of washing machines and read/write heads were about the size of a dime. As time went by and dust collected on the heads, they would fall into the platters' surfaces. The crash destroyed data stored where the head went down. To give you an idea of just how damaging this can be, picture a 747 flying at 600 miles per hour, six inches off the ground; then imagine it crashing to the surface.

The chances of a head crash happening on today's drives are pretty slim. In older drives, the heads were much heavier than they are today, Perry says, and the coating that stored the magnetic signals was much softer. Also, today's hard drives are sealed so dust particles, hair, and smoke can't get inside and hinder the movement of the read/write head.

Current risks include jarring the hard drive while the platters are spinning or experiencing a power loss while you are writing data to the platters. But because platters now are coated with material that is much harder, they can withstand a little jarring. In fact, Mattox says, it takes quite a bang for the read/write head to hit the platter hard enough to gouge the platter and lose data.

Putting On The Fix. If you've actually experienced a head crash, the problem will eventually rear its ugly head. You'll receive data corruption messages from your application software, and you'll be unable to access files and data stored in the damaged area. To check whether the drive has suffered a head crash, you can run a utility program on your hard drive, such as *Norton Utilities* by Symantec (800/441-7234, 408/253-9600) or the ScanDisk utility built into Windows 95 and MS-DOS 6.2. They can help you determine what went wrong and possibly fix the problem by reallocating the data or repairing the file, unless the damage is too extreme.

Other physical hard drive problems are easier to detect. For instance, if you blew the electronics by static discharge or if you had a large surge of power that damaged the drive, the results are obvious.

"All of a sudden, the hard drive won't spin up, it won't make the sounds it normally makes, and you won't be able to recognize (access) the drive," Mattox says.

In these extreme cases, the data may be unrecoverable by user means, unless the user has some sort of backup. If it's a hard drive failure, or if the hard drive simply has worn out over time, the data will still be there; the mechanical parts just may not be able to get to it. If the data is valuable, retrieving it may require a trip to a company authorized to recover data from the drive, such as Ontrack Computer Systems of Eden Prairie, Minn. (800/752-7557, 714/263-9245).

If you've opened the drive to look inside, forget it; the data is history. "There isn't a drive company in the world who will honor the warranty after that," Mattox says.

It helps to run a defragment program regularly. You want to act proactively, so you can catch small problems before they become big ones.

Some causes of data loss are not clear-cut. You can't automatically jump to the conclusion that it's a physical default of the hard drive. Perry suggests one of the easiest ways for a novice to troubleshoot is through a utility program.

With a product such as Norton Utilities, you can fix cross-linked files or **lost clusters** (pieces of information that have been disconnected from their files or programs). Otherwise, says Richard Yin, group product manager at Symantec, the areas holding the lost clusters will be off-limits for saving data until you take care of the lost clusters with a disk utility. Many utilities also can help repair other disk drive abnormalities. But while the programs won't repair bad sectors, they can block them off so your drive won't attempt to save data there. And if, for some reason, your operating system has crashed and won't start again, Norton even has a program that will trick the drive into restarting so you can retrieve your data one last time.

Still unsure of your problem? Run the defragment program found on most utility software products and in MS-DOS 6.0 and newer. If the program makes it all the way through the defragment process without a hitch, the problem is not with your hard drive, but more likely with the application software or operating system, Mattox says. (Files are usually divided into pieces and scattered as they are saved to the disk, taking longer to retrieve. A **defragment utility** puts file pieces on contiguous areas of your hard drive and often checks for bad sectors.)

If the program detects a problem on the drive, it's time for a little trial and error. Perry suggests checking the cables that connect the hard drive and circuit board (making sure you've grounded yourself first so you don't shock the circuitry with static electricity). Sometimes, Perry says, these problems can be solved only by actually replacing the drive and having the manufacturer or other professional do the diagnostics on it. Fortunately, most hard drive manufacturers offer three- to five-year warranties that will cover the cost.

Finally, if the problem simply is that your computer can't find a file, is it possible you've typed in the wrong file name or are looking for it in the wrong directory? Often lost files aren't the computer's fault; they're the user's.

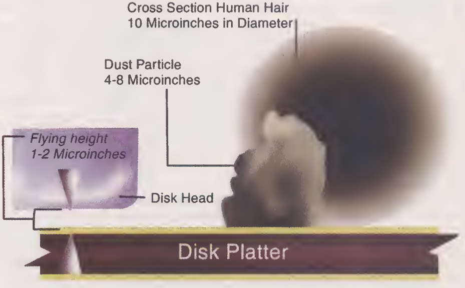
Keeping Fit. There's little you can do to lengthen your hard drive's life physically. Hard drives are designed to take a lot of powering on and off, Mattox says, and are sealed to protect themselves from the environment. They operate better, however, outside of high humidity and at the same temperatures that are comfortable for their users, Perry says.

On the software side, it helps to run a defragment program regularly or other hard drive checking utility about once a week to keep things running smoothly. You want to act proactively, Yin says, so you can catch small problems before they become big ones.

The ultimate maintenance tip is the same one we at *PC Novice* give you any time you make a change or adjustment to your computer—back up, back up, back up. You need to make a copy of important files on diskettes or of everything on your drive to another medium, such as a tape drive or other storage alternative. (For more information on alternatives, see "Storage: It's Not Just Your Hard Drive Anymore" in this issue.) The price of another storage medium is much less than what it will cost you to have a specialty company retrieve the data for you.

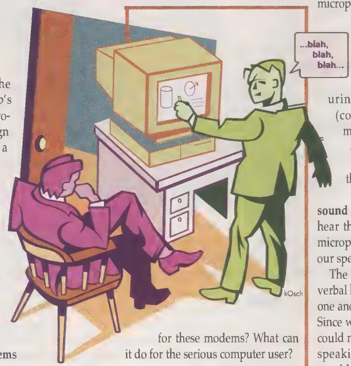
Perry of Seagate compares backups to having insurance. "Yes, the chances of having a fire are very slim, and the chances of losing data are very slim. But you will be pretty glad you had that insurance policy, or pretty glad that you had the backup, even if it happens to you only once." ■

by Cindy Krushenisky



How important is it to keep a hard drive sealed? It's critical. As you can see, there's no room for relatively bulky contaminants such as dust and hair that may interfere with the precise disk head.

DSVD Modems Let Your Voice Be Heard!



You wait at the edge of the darkened room, your ship's engines idling lightly. No robots, and, more importantly, no sign of your enemy's ship. You spot a blue booster for your ship's shields across the room and edge toward it. Suddenly, an explosion rocks the wall beside you. You click your rear view on and spot your opponent bearing down. He fires a homing missile, and you hear him yell tauntingly, "Goodbye, maggot!"

The tension of multiplayer games is nothing new. Humans have always made better opponents than computers, and **modems** (devices that let PCs communicate over phone lines) have been competitive links for as long as they've existed. What's new is being able to converse with your gaming partner during play through a DSVD modem.

■ What's DSVD? **Digital Simultaneous Voice and Data** (DSVD) modems can transmit voice and data simultaneously on a single Plain Old Telephone Service (POTS) line. Most modems allow only data transmission, and even older models with voice transmission capabilities required users to switch back and forth between voice and data.

DSVD modems split the transmission of information between both voice and data. Two-thirds of the transmission capability is used for data transmission, and one-third is used for voice transmission. Both users in a conversation must have DSVD modems in order to communicate verbally; otherwise, the DSVD modem will switch all the capability to data transfer.

Maybe you're not impressed because some computer dorks can now scream at each other while blasting creatures in PC games. What, you may be wondering, are other applications for these modems? What can it do for the serious computer user?

■ Putting It To Work. DSVD modems add a new aspect to communications and personal conferencing software. You and a partner still can take part in every aspect of interactive software, such as **virtual whiteboards** (programs that let users draw on each other's screens, as if they were sharing the same greaseboard), and now talk to each other at the same time. This can be a great aid for transferring files, editing documents, or running any type of program on interconnected machines.

Perhaps the most potential for DSVD lies in technical support. Imagine having a DSVD connection and letting techies take control of your system, constantly informing you of what they're doing to solve your problem.

■ Testing Our Voices. We tested this technology using two Hayes Accura Internal 28.8 kilobits per second (Kbps) DSVD fax/modems (street price around $259 each) while playing Interplay's *Descent II*, a 3-D flying game selling for about $50, on systems with the Windows 95 operating system. (The strenuous demands that a game such as Descent II places on the graphics and audio capabilities of a computer make it a good testing field.)

We installed the modems and game on both PCs. The modems went in easily, but required some fiddling to get some **interrupt request line (IRQ)** conflicts solved. (Hardware devices each use an IRQ to send interrupt signals to the microprocessor and demand service.)

After we hooked up the modems, we had to set some parameters, such as what number to dial, where the modem and sound card were located, etc., within Descent II. Configuring the **modem initialization string** (commands the software sends to the modem to prepare it for the connection) according to the manual's desired settings was the toughest part of getting the voice capabilities to work.

We ran the modem's output into our **sound card** (so this circuit board could let us hear the game's sound effects), plugged our microphones into the modem, and hooked up our speakers to the sound card.

The modems worked well, letting us share verbal hints when working together and berate one another during one-on-one death matches. Since we were in the same (physical) room, we could notice a slight delay between one person speaking and the other receiving, but this would be inconsequential if two users were separated by just blocks or thousands of miles.

At the least, we decided, DSVD is innovative technology. At best, it will become the new standard for any kind of modem communication. ■

by Joel Strauch

For More Information:

Accura Fax/Modem with DSVD
Hayes Microcomputer Products Inc.
(770) 840-9200
http://www.hayes.com

Descent II
Interplay Productions
(800) 969-4263, (714) 553-6678
http://www.interplay.com

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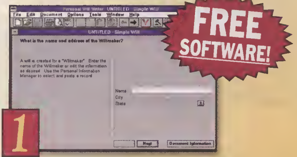
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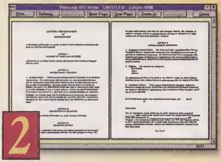

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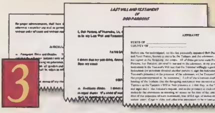

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Banking Online

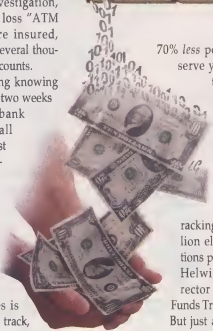
How Safe Is Your Money?

When the ATM screen reported Jonathan Lerner (not his real name) had already withdrawn his $300 limit for the day, he chalked it up to a bank screwup. Had he contacted his bank immediately, he could have prevented both his savings and checking accounts from being digitally drained. Instead, it took two more ATM messages plus a bank form letter alerting him to a possible "misappropriation of funds" before he acted. By then, Lerner, a writer from Los Angeles, discovered what thousands learn the hard way: Electronic banking can be a dangerous and unsafe place.

Luckily, his bank was able to recover security surveillance shots showing several strangers using a bogus ATM card to abscond with Lerner's cash. After an investigation, bank security deemed Lerner's loss "ATM theft." Because his funds were insured, Lerner's bank ate a hefty loss of several thousand dollars and restocked both accounts.

"Aside from the helpless feeling knowing someone stole my money and the two weeks I had worrying whether the bank would decide to repay me, it all turned out OK," Lerner says. "I lost some sleep and a few hundred dollars, but I know it could have been worse."

In fact, it could have been much worse. Stealing funds from banking networks is nothing new. It's been going on since the first ATM was installed in the early 1970s. But a revolution in new electronic banking services is changing the way we spend, save, track, budget, and transfer money. A new breed of banking software programs coupled with startling financial alliances and the Internet's expansion are creating an unstoppable trend that starts at your local ATM and ends with your PC.



Banks Close, ATMs Open. Banks love ATMs. They don't eat, sleep, take holidays, or ask for raises. In fact, it costs a bank 50% to 70% *less* per transaction to serve you electronically than by human teller. Which is why there are more than 125,000 terminals—up from 80,000 in 1990—in the United States alone racking up nearly 9 billion electronic transactions per year, says Kurt Helwig, executive director of the Electronic Funds Transfer Association.

But just as the numbers of ATMs—and their fees—are increasing, banks themselves are disappearing. Tremendous competition and rising costs have forced many banks to merge or fold while the rest are consolidating, closing branches, and reevaluating services. Studies like an Ernst & Young report published in the American Bankers Association newsletter predict banking by computer and telephone will eventually replace banking in person. A staggering 84% of all banks plan new online services, with 61% piloting or planning banking services through the Internet.

The benefits of computer banking—convenience and time savings—have never been in doubt. Personal finance software such as *Quicken* has reconciled checkbooks and written checks electronically for more than a decade. Combined with *Checkfree* and Prodigy's *BillPay USA* (Jump: **billpay**), bill payment information is wired over a modem and, without ever printing a check or buying a stamp, these services blast out your payments.

The problem with home-banking software was that the promise was always greater than the delivery. Until now.

Banking On Your PC. With a potential customer base of more than 9 million users of personal finance software, the banking industry sees the profit potential of electronic banking. In less than a year, more than 30 major financial institutions have agreed to offer online services to customers using these personal finance programs. Nationsbank and Bank of America have even bought Mecca Software's *Managing Your Money* and plan to introduce their own products linking future bank partners.

The result is a stronger and easier-to-use link between your bank and your financial software. Banks, no longer tethered to one location, are using the Internet to reach out to customers with a wealth of new and improved services. Together, these partnerships are forming the financial fabric of what will become Internet banking.

Better still, Intuit's Quicken and Microsoft's *Money for Windows 95* have revamped their latest versions, making them even easier to use. Suddenly, you have the freedom to use any bank, anywhere in the world. Even if that bank doesn't have a branch in your neighborhood, you can bet an ATM is linked to a bank near you.

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HOW TO CASH-IN AS A MERCHANT

Services such as CyberCash are racing to become the standard for exchange when dollars are abandoned for digits.

Digital Dollars. While financial institutions and major software companies scramble to create a web of virtual banks, other companies are experimenting with what could be the biggest revolution in currency—electronic versions of credit cards, checks, and cash. Companies such as DigiCash (http://digicash.com), CyberCash (http://www.cybercash.com), and First Virtual (http://www.firstvirtual.com) are racing to be the first exchequers of the electronic world.

Considered the inevitable medium of exchange for an increasingly wired world, digital dollars, if successful, will make spending money on the security-challenged Internet safer. At stake, according to a recent Forrester Research study on Internet commerce, is a lucrative chunk of worldwide revenues from interactive online sales, which jumped from $240 million in 1994 to $350 million in 1995 and could reach $6.9 billion by 2000.

But not every online banking solution is destined to come from your PC. One serious concern is that low-income consumers unable to afford a PC will be denied access to these new services. To the rescue is yet another bankable solution—a gussied-up telephone! Aimed at the more than 65% of U.S. households and 90% of households around the world without a home computer, "smart phones" of the future will include a small screen, modem, and credit card reader. For about $250 to $400, they're expected to deliver E-mail, carry out banking transactions, facilitate shopping sprees, summon information, offer caller ID and, of course, phone home.

Don't Bank On The 'Net. But even as the banking industry re-invents itself with new goods and services for tomorrow, online banking crime is skyrocketing today. How bad is it? After a recent eight-month study on "Security in Cyberspace," the Justice Department could only guestimate the damage between $500 million and $7 billion in a report to a Senate subcommittee.

ATM-related fraud accounted for $11 million in 1994, according to the American Bankers Association. And while substantial, it's minor compared to the $815 million in annual check fraud, the $2 billion in telephone fraud, and the $1 billion in credit card fraud.

Privately, financial analysts fear it will get worse before it gets better as the banking industry races to iron out all the interconnectivity wrinkles. They point to an already overcrowded banking network that will only get busier (and more complicated) as more customers try new online banking services. The American Bankers Association expects more than 70% of all financial institutions to support online banking features by 1998, accounting for a 600% increase in overall usage.

But you don't have to get trapped by accelerating technology. Protecting yourself against an unauthorized invasion of your home-banking software is still a matter of good old-fashioned common sense, such as not writing your PIN (Personal Identification Number) on the back of your ATM card, says Barry Schreiber, a professor of criminal justice at St. Cloud State University in Minnesota and editor of the 5-year-old *ATM Crime & Security Newsletter.* Here are a few steps that can keep your cash in your account.

Bank-At-Home Safety Tips.

1. **Thanks for the memory.** Keep your home-banking PIN confidential. In passwords, don't use your initials, birthday, social security number, or your mother's maiden name. The best passwords combine letters and numbers, or letters and symbols, and should be changed every three months, advises Melkon Khosrovian, spokesperson for Great Western Bank.

2. **Mobile computing.** Keep all home-banking documents that have account information in a secure location. Be especially careful if financial files are on a portable PC, which is easier to snatch than a desktop.

3. **Separate but equal.** Maintain separate PIN numbers for your ATM and home-banking accounts.

4. **Just say no.** Never release private information about your home-banking system. Be suspicious of anyone who calls, says they're from your bank, and wants to verify your account numbers, social security numbers, or PIN codes. "No legitimate banking or law enforcement official will ever call and ask for your PIN," Schreiber stresses.

5. **Never on the 'Net.** Never send confidential data with account or credit card numbers over the Internet or through E-mail, advises Mark Rodgers, vice president of Citibank. "Using the Internet is like writing a postcard instead of sending a letter. If you do plan on using a credit card number, seek out a private connection for the most secure transactions."

Even though the Electronic Communications Privacy Act of 1986 makes it a felony to intercept E-mail, anything on the Internet is up for grabs. Internet security breaches usually happen as E-mail winds its way from your PC through various routers, systems, and services. A direct connection reduces unauthorized access. It also reduces the chances of being stung by cyber-chicanery called "fishing," where someone hacks into the system and, pretending to be a representative from your bank or online service, asks you to rekey in your password. Don't do it. Log off and try again. If the problem persists, wait and call your bank.

6. **Tales from the crypt.** If you must send sensitive information over the Internet, protect it with special data encryption software, Rodgers says. Encryption scrambles data with secret codes, rendering it unintelligible until it's deciphered by the intended recipient. Encryption is the key to making banking and business in cyberspace safe because: (1) it secures the channel, ensuring no can read your message in transition; (2) ensures message authentication, verifying

the sender's identity; and (3) guarantees message integrity, verifying the message contents have not been altered. Data encryption from RSA Data Security is used by giants such as Microsoft, Apple, Lotus, Visa, and Mastercard. Similar (though not as strong) encryption features can be found in utilities such as MicroHelp *Zip* ($29.95; 800/777-3322, 770/516-0899), Nico Mak's *WinZip* ($29.95; 800/242-4775, 713/524-6394), or ViaCrypt's *PGP*—Pretty Good Privacy—($129/personal edition, $149/business; 800/536-2664, 602/944-0773).

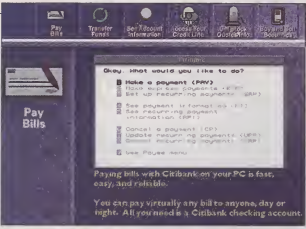
7. **Network no-no.** Don't store bank-at-home software or files on a network server or a shared drive accessible by other network users.

8. **Remote control.** Don't give out your modem number. Remote control software can be loaded onto your PC through an open modem line, letting data tappers control your PC and access financial information.

9. **Practice safe computing.** Safeguard financial information with regular backups and antivirus software.

10. **Security alert.** If you share a PC with a coworker, use the password feature that comes standard on all bank-at-home software. For example, before Quicken users can access account data at any bank, they must supply both a PIN for their bank as well as their Intuit membership password. Many bank-at-home packages can store passwords. While having your software automatically enter your stored password is convenient, it removes a level of security, letting anyone with access to your PC get into your financial software, cautions Harvey Radin, vice president of corporate communications at Bank of America.

11. **Check** your statements every **month.** If you even suspect that a transaction was not made by you, call your financial institution *immediately*! The longer you wait, the more getaway time a cyberthief has, Radin says.



Okay. What would you like to do?

Make a payment (PAY)

Paying bills with Citibank on your PC is fast, easy, and reliable.

You can pay virtually any bill to anyone, day or night. All you need is a Citibank checking account.

Bank-at-home services such as Citibank's pay bills with minimal hassle and no checks or stamps.

If You Suspect A Problem. Which brings us to the flip side of the coin; what do you do if you suspect a problem or become a victim of online crime? Though procedures vary among banks, the most important rule is not to panic. The good news is if you're banking with any legitimate financial institution, your money is insured, Rodgers says.

The bad news is that as online money transaction gets faster, financial institutions lose their ability to check every transaction.

"Financial institutions can barely process all the paper and electronic information they receive now, which is why check forgeries are at an all-time high," admits one bank official. "Until stronger electronic safeguards are developed, the onus of checking for online or any banking fraud rests with the customer."

Until then, here's what you can do:

1. **Better safe than sorry.** Treat a possible problem like the real thing. Report it immediately to both your local bank and police department to limit the extent of the damage. Banks take electronic banking fraud very seriously. They'd rather you report a problem that turns out to be nothing than not report anything.

2. **Remember that if you've been defrauded, the bank eats the loss.** But even though it may cost you nothing, like Jonathan Lerner's experience, it's still a hassle to straighten out, Rodgers cautions.

3. **Return banking forms promptly.** Your account will be closed or placed on hold, and your ATM card invalidated. If your home-banking account was breached, all account data and codes must be canceled and changed.

4. **Bank on a prompt decision.** By law, banks have 10 working days to investigate and make a decision. If you disagree, appeal it. Check your bank for details.

5. **Change all password and PIN security codes.**

6. **Check your account daily.** Data-tapping infohighwaymen love returning to the scene of the crime. Carefully watch all transactions.

7. **Know the code.** Canceling a PIN does not affect other banking services. "In many cases, customers are afraid that canceling a PIN number will somehow deny them access to other banking services ," Khosrovian explains. "That is not the case. You always have full access to all your accounts, even the one you're reporting the problem on or canceling the ATM or home-banking account."

Banking On The Future. No banking system is 100% secure. "Thieves will always be attracted to any new avenue of technology where they hope to get something for nothing," Schreiber warns. To benefit from global banking, select software and banking that meet your needs, watch transactions closely, and report anything out-of-line. ■

by Michael Cahlin

For More Information:

Check out the following Web sites or call your local bank to see which (if any) option it offers or plans to support.

- Bank of America (800/363-BOFA, http://www.bofa.com) has two options. You can get *Managing Your Money* ($19.95), which connects directly from their computer to yours, bypassing the Internet. Or using any Internet browser, you can log on to their Web site and, after registering, pay bills without any special banking software.
- Checkfree (800/882-5280, 614/825-3500, http://www.checkfree.com) offers several levels of electronic bill payment rates starting at $5.95 per month for the first 20 transactions, with each additional set of 10 for $2.95.
- Citibank (800/967-2300, http://www.citibank.com) has its own online banking software.
- Intuit *Quicken Deluxe 5* (800/624-8742, $59.99, http://www.intuit.com/quicken) works on Windows 3.1 and Windows 95; DOS and Macintosh versions available.
- *Microsoft Money for Windows 95* (800/426-9400, $34.95, http://198.105.232.7/msmoney).
- Nationsbank *Managing Your Money* (800/933-6262, 214/263-4377, $19.95, http://www.nationsbank.com). ☐

Presentation Software

From Boardrooms To Web Pages

kOsch

Nothing stays static for long in the computer industry—that is, if it wants to survive. Computers themselves are evolving almost constantly. A couple of years ago, few people had heard of CD-ROM technology. Now, it's difficult to find a new computer without a CD-ROM drive built in.

Standing out in this world of rapid change, there is one type of software that changes so often it makes the evolving computer industry look as invariable as corn flakes—presentation software.

Past Presentations. Not long ago, a presentation amounted to a short speech illustrated by a few visual aid charts or (on the high end of technology) an opaque projector with black-and-white transparencies. If presenters were fancy, they even may have used a color slide projector. When presentation software was first introduced about 10 years ago, it did little to change that. It was mainly a tool for graphics designers to use in the creation of these charts, transparencies, and slides to aid presenters during their presentations.

Modern presentation software doesn't look like it should even share the same name. The basic presentation packages—Microsoft's *PowerPoint for Windows 95*, Lotus' *Freelance Graphics 96*, and Software Publishing's *Harvard Graphics 4.0*—are powerful, easy-to-use tools for the creation of slide shows and charts, both on-screen and on paper. Because of this ease of use and the inclusion of premade charts and templates (a series of customizable slides), the creator and presenter are often the same person.

Dave Martinez, the product manager for PowerPoint, says, "When presentation software initially came out, there was a core group of individuals, professional presenters, that immediately latched onto it. Now, the common user of presentation software is radically different. Presentation software is in the hands of millions of people."

Suite Spot. How did this complicated and expensive software go from being used almost exclusively by experts to being loaded into the hard drive of the average user? It was bundled into Windows **suites**, which are software packages that contain several useful programs such as word processors, spreadsheets, and schedulers.

But even though packaging presentation software with other programs will increase the number of people who own it, it doesn't mean the owners will necessarily use these products as they were originally intended. Not everyone who has the software will be making huge boardroom presentations for their corporations. The software is now being used by nonstandard people in a lot of nonstandard environments, Martinez says.

For example, many users run their own business or work in a small company and might need to communicate with their coworkers. Presentation software is ideal for this type of correspondence, says Bob Norton, director of product management for Lotus' Freelance Graphics product line.

"The average (presentation software) user is a businessperson, someone who is presenting their wares to an audience," Norton says. "But there's a growing base of users who don't present outside their company but make internal presentations to small groups of people."

The fact that more people are using presentation software for many types of presentations has altered the appearance and the performance of the software. Making presentation software easy to use and familiar to the user has become a major selling point of new versions.

"(New users) are not going to be in presentation software everyday the way they're in a word processor. This means that ease of use becomes incredibly important because people are essentially relearning the software every time they come into it," Martinez says. "You also need a program that looks a lot like products that people already use, so when people come into the program, they feel like they already know where they are."

A Quick Look. That's why the latest versions of presentation programs are easier to use than most paint programs. We had few problems finding our way around any of the packages and creating slide shows. The menus are no more complicated than the average word processor's. All of the packages also include detailed tutorials (both for introduction and during use) and help programs that guide users as they make professional-looking presentations. And, after a presentation is completed, each package has advice programs that ensure the presentation includes the right balance of headers (titles), bullets (short text statements), and clip art. Text can be created within the programs by using a wide variety of fonts, type styles, etc., or it can be imported from a word processing program. Users also have the option of importing clip art or using the art that comes with the presentation software.

The three packages reviewed below are very similar to one another, but each has some qualities that can be beneficial for specific presentation needs. Both PowerPoint and Freelance Graphics are included in suites. PowerPoint on its own costs around $350, but it also comes bundled in the *Microsoft Office* suite, which sells for $499. Similarly, Freelance Graphics 96 costs $355 alone, or users can purchase the entire Lotus *SmartSuite 96* for around $399. Harvard Graphics, however, is available only as a standalone application for $290.

Freelance Graphics 96. The first thing that's noticeable about Lotus' latest presentation software version is how easy it is to look at your slide show from different angles. All of the packages include three ways of organizing the slides: an outline form, a sorter (which has little previews of all the slides), and a big image of the slide currently being worked on, but only Freelance Graphics gives you tabs above the page to switch among the slides instead of using sometimes-hard-to-find icons.

Freelance Graphics is easier to use than Harvard Graphics (reviewed below) and has an amazing number of style templates to choose from (more than 100, which is a lot more than the others). Its tutorial is also unique. Designed with an emphasis on the content of your presentation, Lotus' Smart Masters tutorial presents advice from well-known figures in the sales and marketing world, such as the self-help sales guru Zig Ziglar.

The popularity of networking and the Internet have not gone unnoticed by Lotus. Its Team Review option lets you easily send a completed presentation to co-workers via a network or E-mail for their review. It even lets them include their comments and then reroute it back to your desktop. Presenting to the Internet is still in its early stages, but Lotus is already online. (See the attached sidebar "Worldwide Presentations" for our Web presentation adventure.)

Freelance Graphics 96 gives plenty of help and advice to the beginning presenter but also has many powerful options for more advanced users.

Harvard Graphics 4.0. This program is heavy on charts and a little more complicated to use than the other two. It includes many taskbars that clutter the screen with icons. The back of the manual includes a quick reference guide for all of these icons, but maneuvering among them takes some getting used to. If chart creation is your thing, however, this is the package for you. Harvard Graphics includes almost 90 different chart styles, including half a dozen different types of pie charts and more than a dozen bar graphs.

Another outstanding characteristic of this program is the advice it gives. It includes three advisers that are always available in the right margin. The Quick Tips adviser gives helpful tidbits that correspond with the current slide you are working on (such as which mouse button to click to change text size). The Design Tips adviser gives more general advice on the overall appearance of the slide (such as a warning to avoid all capital letters because it

Worldwide Presentations

Business presentations have come a long way from the old days of pointing at sheets of posterboard, articulating points by smacking a stick against a graph, and creating transitions by moving the front page to the back of the stack.

The glimmering multimedia of today's presentations may soon make this same transformation to the mundane. New techniques and technologies are quickly taking presentation software to the next level.

The capabilities of the Internet have demonstrated the potential usefulness of having an online presentation. Instead of arranging a meeting with a captive audience to deliver your spiel, interested parties can swing by your Web page and run through your presentation at their own pace.

We decided to place a sample presentation we made on a Web page for all the world to see. Both Microsoft and Lotus have built **hypertext markup language (HTML)** capabilities into their presentation programs. (HTML is the computer lingo that Web pages are written in. For example, an HTML line used to place a graphic on Web pages looks like <A HREF = "Cars.bmp"> My '57 Chevy </A>.) For this demonstration, we used Lotus' *Freelance Graphics 96*.

Freelance Graphics will re-create the pages of the slide show and the connections between them in HTML. You also have the option of including a text version of the speech you would make along with the presentation, letting visitors to the site view the presentation almost as if you were actually giving it.

In the File menu, there is a Publish To Internet option. After you left-click this, Freelance Graphics saves each page of the presentation as both an HTML and a .GIF (graphics) file, which then can be **uploaded** to a Web site folder. (Uploading is the opposite of **downloading**. Instead of moving pictures or programs from another site to your computer, you move pictures or programs from your PC to a Web site.)

Uploading is accomplished through a **file-transfer protocol (FTP)** program, which lets you send and retrieve files over the Internet. After we made our connection to the folder for

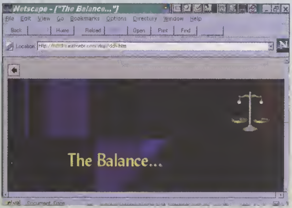


Figure 1: In the *Netscape Navigator* browser, the "back" arrow at the top left of the screen is normal size.

makes text harder to read). And the Check Design adviser will scan through a completed or partially completed presentation and tell you what can be done to improve it (such as adding more clip art or shortening bullets).

Harvard Graphics isn't as strong in some of the multimedia areas as the other two packages, but it comes with almost 50 prepackaged templates, and it takes the pie in chart manufacturing.

PowerPoint For Windows 95. Because it's made by Microsoft, PowerPoint integrates well with Win95 and allows for easy importation from other Microsoft programs such as *Microsoft Word* and *Excel*.

PowerPoint is also the easiest presentation package to use, especially when it comes to multimedia aspects, such as animating slide features. The Animation Effects Toolbar makes it as easy as pointing and clicking to create animated slides. And PowerPoint has automated many aspects of the presentation to make it even easier for the beginner. One of the neatest examples is Auto Clip Art. Each package comes with an extensive clip art library, but it can get tedious searching through these programs for the right icon for a slide. Auto Clip Art will search through your slides, looking for concepts, and then suggest images that it thinks would be appropriate. It didn't always recommend the best icons in our tests, but it was surprisingly accurate.

Microsoft has really made an effort to fit its package to the needs of the new presentation software user. PowerPoint's Getting Started Guides and AutoContent Wizard are beneficial aids, but the Answer Wizard was the best source of help. Unlike most help programs, you don't have to search through an index of topics written in the programmer's techno-babble. With the Answer Wizard, you just type your question in plain English, and the Wizard will bring up the topics that will help answer your question. For example, we asked it, "How do I animate slides?" and it gave us a range of topics from "How do I add transitions to a slide show?" to "How do I create a slide with animated objects?"

PowerPoint is also on the Webwagon. The presentation package allows for the development of branched presentations (that don't go in linear order) that then can be placed on a Web page for Web wanderers to guide themselves through.

Though PowerPoint isn't as packed with premade templates and charts, its tutorials and help wizards make PowerPoint an excellent presentation software package for the beginner. (For more information, see "Making Your Point With PowerPoint, Part II" in this issue.)

The ever-changing world of presentation software has something for everyone who wants to present their products and ideas to an audience, be it just one other person or the whole world. ■

by Joel Strauch

For More Information:

Freelance Graphics 96
Lotus Development Corp.
(800) 343-5414
(617) 577-8500
http://www.lotus.com

Harvard Graphics 4.0
Software Publishing Corp.
(800) 336-8360
(408) 537-3000
http://www.spco.com

PowerPoint For Windows 95
Microsoft Corp.
(800) 426-9400
(206) 882-8080
http://www.microsoft.com

our Web page, we just transferred all the files from our presentation to that folder.

In order to let people get to the presentation from our page, we had to create a **hyperlink**. Hyperlinks are the glue that holds the Web together; they provide connections to everything from other pages at your Web site to people's pages on the other side of the planet.

(This is a good time to explain the difference between a Web page and a Web site. A Web site is a general location on the Internet, such as PC Novice's site: www.pcnovice.com. A Web page is an individual spot on that site, such as PC Novice's customer service page: www.pnovice.com/pcncstsv.html.)

We were really surprised by how fast each page appeared on-screen. Normally, large images take a long time to download (and show up on-screen), but the images of our presentation popped up quickly.

Part of the HTML file for each page includes icons that appear as little arrows at the top of each image to create links to other pages in the presentation. We ran into a little glitch here. Most of the **Web browsers** (programs used to surf the 'Net) we used worked fine, showing these icons just as they were meant to appear—as tiny arrows above the image. But one browser made the box for these arrows huge, requiring the user to scroll way down in order to find the image of the page (see Figures 1 and 2).

This glitch was minor, but it's indicative of early efforts to take advantage of new technology. The next version of Freelance Graphics (97) will have greater abilities for dealing with Internet presentations, according to Bob Norton, the director of product management for the Freelance Graphics product line.

Norton says the Internet presents a great growth opportunity for presentation graphics packages. "We think longer term, people don't want to edit HTML. That's ugliness that people expect to be buffered from. The largest potential for the Internet . . . is to hide the user completely from this stuff. We're looking to make it even easier."

Well, Freelance Graphics made it pretty easy for us to post to our Web page. Writing a comparable presentation in HTML format would have been pretty ugly indeed. ☐

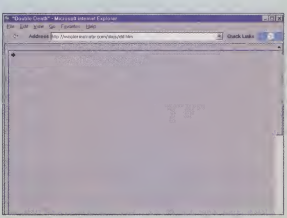
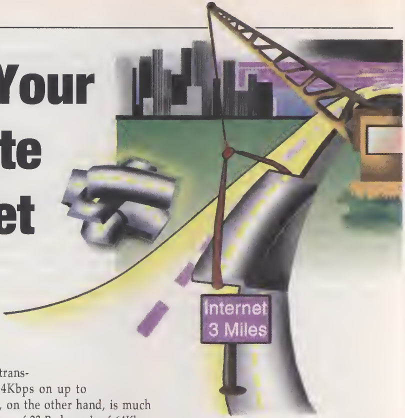

"Double Death" - Microsoft Internet Explorer
File Edit View Go Favorites Help
Address http://ncolor.inetnebr.com/dojs/dd.htm
Quick Links

Figure 2: In *Internet Explorer*, however, the box containing the arrow takes up the whole page, requiring users to scroll down before being able to see the presentation.

Widening Your Route To The Internet



Cruising the Internet can be pretty slow with your 28.8 kilobits per second (Kbps) or 33.6Kbps modem, especially if you're trying to view video, transmit huge multimedia files, or play an interactive game against an online opponent. If you're considering a faster Internet connection and have a little extra cash, there is a plethora of options available now or on the horizon.

ISDN. One of the more popular ways savvy consumers speed their access is through an **Integrated Services Digital Networks**, or **ISDN**, connection. Unlike your 28.8Kbps modem, which uses ordinary phone lines to transmit information through analog signals, ISDN connections keep the data digital. (Information is stored in your PC digitally, but when you use a modem, the information must be transferred into analog signals so it can be sent over regular phone lines.) To do this, you need access to special ISDN service, which is digital and can transfer data faster and more efficiently than analog systems. (For more information about ISDN, see "ISDN Speeds Online Access" in the August 1996 issue of *PC Novice*.)

ISDN connections come in a couple of flavors—**Basic Rate Interface** (**BRI**) and **Primary Rate Interface** (**PRI**). BRI is the service used mostly by homes and small businesses. Users are typically charged by per-minute rates, in addition to a fixed charge of $35 to $200 depending upon the user's location and a charge that can exceed $100 for installation. Businesses ordinarily use the PRI service to create their own **wide-area networks** (**WANs**) for voice communications and to connect computers in different buildings and cities.

BRI lines are made up of two **B** (or Bearer) channels, which each can transmit 64Kbps, and one D (or Delta) channel transferring 16Kbps. This allows BRI to carry on two simultaneous voice or data communications at once. Altogether, the channels can transmit data at 64Kbps on up to 128Kbps. PRI, on the other hand, is much wider, consisting of 23 B channels of 64Kbps and one D channel of 64Kbps. When you total it up, PRI can have a total bandwidth of 1.544 megabits per second (Mbps).

ISDN is a **switched service**, which means usage charges accrue only when you use your computer to communicate, says Marty Schulman, consulting engineer for Cisco Systems. To put it in simple terms, your connection gets switched on when you dial in and access the Internet. It's a lot like the regular telephone service you are used to, Schulman says. You request the dialing number of where you want to go, and the service puts you through. When used with an Internet service provider (ISP), these types of connections work efficiently, but your ISP must have enough capacity for all its customers. Otherwise, too many users may try to connect through the switched circuits at once, giving some users a busy signal.

Point-to-point. If you don't mind paying a little more money, you can avoid a busy signal altogether and get a **leased point-to-point line**. This is a direct connection to the Internet that's available 24 hours a day, seven days a week. It's like having your own private road to the Internet. Although you can't use this path for any other purposes, a leased line is great if you don't want other traffic interfering with your access.

If you decide to get a leased point-to-point line, your next decision will be deciding the speed at which you want to connect. So, if you think of the Internet as part of a grand superhighway, Schulman says, consider 56Kbps, T1, and T3 links to be the street widths.

Just like ordinary highways, the telephone network is made up of traffic lanes, or **channels**. Each lane can handle a two-way phone call or can connect a computer to a network, such as the Internet. One of these lanes can handle about 56Kbps of digital data; that's why a telephone line may be referred to as a 56Kbps circuit. But why can analog modems only send a maximum of 33.6Kbps over telephone lines, you ask? Schulman says that data converted into analog waves is an inefficient process, preventing the data from occupying the full width of a telephone lane.

Therefore, if you're a small business and want a direct connection using one phone lane, you'd want a 56Kbps line. A **point-to-point 56Kbps** connection can cost around $300 to $600 a month, depending upon the user's distance from the ISP's nearest Point of Presence (POP).

The next step up in point-to-point connections is a **DS1** link, more commonly referred to as a **T1** link. This "T-carrier" connection is 24 lanes wide, which altogether can transfer a little more than 1.5Mbps. Because point-to-point T1 connections often cost about $1,000 or more a month, depending upon the distance (plus, occasionally, an initial setup charge), they usually are ordered only by businesses, Schulman says, and not average consumers.

For users who don't need all 24 lanes of a T1 link, some companies offer **point-to-point**

fractional T1 lines, in which the full 24 lanes are there, but some of the lanes have been "blocked off by orange cones or barrels," Schulman says. A point-to-point fractional T1 connection typically costs somewhere between a similar 56Kbps and T1 circuit, and if users decide they want more bandwidth, they just ask the company supplying the line to remove some of the cones.

For businesses that can afford several thousand dollars a month for really fast networks—perhaps large corporations or ISPs themselves—there are **point-to-point T3** lines, also known as **DS3** circuits. They have 672 lanes transferring about 45Mbps of data. Or some businesses even may require a SONET (Synchronous Optical Network) Optical Character-3, or **OC-3**, circuit with around 2,000 lanes transferring about 150Mbps, Schulman says. Both of these connection types, however, require special **fiber optic** lines to transport the data. (Fiber optic cables carry pulses of light, transmitting digital information at the speed of light.)

Switched Services & Packet Switching. Of course, there are cheaper alternatives to the point-to-point links. If you want a fast connection but don't want to pay the money for a direct link, check for a **switched 56Kbps** link. Like ISDN, a switched connection is not a direct link that's available just to you. But you pay only for how much you use the line, and that may cost you only about $100 or so a month.

Or, you might want to consider a **frame-relay** line, which some phone companies offer to businesses as an alternative to ISDN. Frame relay can deliver through 56Kbps connections, T1 links, or even faster means. Frame relay uses something called **packet-switching**, Schulman says, and you only pay for how much you use the line. To understand how packet-switching works, imagine the ISP connecting multiple users to multiple sites on the Internet, using intersections and stoplights. The switches let data "trucks" enter any wire or exit via any other wire independently. Frame relay is a good solution for businesses who want to work with the Internet at fast speeds but don't want to pay a lot for private access. A frame-relay line can cost a few hundred dollars a month for a small bandwidth on up to around $1,000 a month for a T1 bandwidth.

An even speedier and more expensive use of packet-switching using T3 links is supported by a technology called **Switched Megabit Data Services**, or **SMDS**. It operates along the same idea as frame relay, but at much faster rates. SMDS is not currently as popular as frame relay, but that may change in the near future. Schulman says the highest-speed, packet-switching services can be delivered using a system called **Asynchronous Transfer Mode**, or **ATM**. This can be used on T1, T3, OC-3, and even faster circuits. Again, these methods are used primarily by bigger businesses (especially for networking office computers) or by ISPs.

Other Options. In the early '90s, several architectures were unveiled that would bring interactive television services to our homes. Now, they are being further developed so that we might use them one day to connect to the Internet, Schulman says.

One of the big favorites of the telephone companies is the **Asymmetric Digital Subscriber Line**, or **ADSL**. While it can send 1.5Mbps (the same as T1) on up to 6Mbps (four times as fast as T1) of data to your home from the ISP, the transfer rate going out of your home to the ISP is lower, starting at only about 64Kbps. The technology uses regular copper phone lines and an ADSL modem and looks promising for videoconferencing over the Internet. However, it's still in the testing stages for the consumer market.

Another competing technology that's not yet ready for "prime time" uses a cable modem and the coaxial wire from your cable television. A cable **connection** can transfer about 6Mbps to 27Mbps. This option is expected to cost much less than a point-to-point T1 connection when it becomes available.

Lastly, someday we may look skyward to receive data through **satellite broadcasting**, somewhat similar to satellite TV signals. You might be able to receive between 200Kbps and 30Mbps of information, but very few companies have explored this market.

Getting Hooked Up. Businesses and consumers can sign up for special connections through an ISP and let the ISP handle the access line. Or, they can order the line from a local exchange carrier (such as Nynex or GTE) and get the Internet connection through the ISP, Schulman says. Either way, you'll end up paying the phone company for the wire and the ISP for the connection.

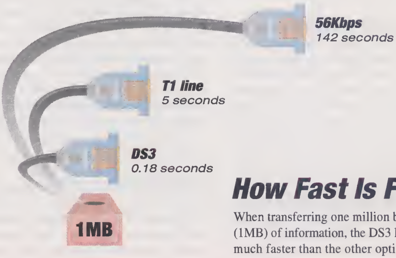
Special equipment is necessary to use most connections and may cost you a couple of hundred dollars to get installed. The equipment varies according to the type and speed of the line. For example, you'll need a **network terminator** (NT) to adapt your equipment for ISDN transmissions. Or, a point-to-point 56Kbps line or T1 line might require a **Data Service Unit/Channel Service Unit** (DSU/CSU) to connect to a digital circuit. The ISP should help you get set up with the equipment you need.

If you want to get an accurate idea of what's available, try The List at http://www.thelist.com. It's a database of about 2,000 ISPs, usually including connection options and pricing.

Fast Access, Slow Internet. Keep in mind that even though you gain a fast link to the 'Net, it doesn't ensure you will be cruising in the fast lane.

These access technologies are just your on-ramps, Schulman says. Having a 24-lane on-ramp to a one-lane road is like having a high-speed connection to a congested Internet. You'll get there faster, but you'll be moving with the rest of the pack. ■

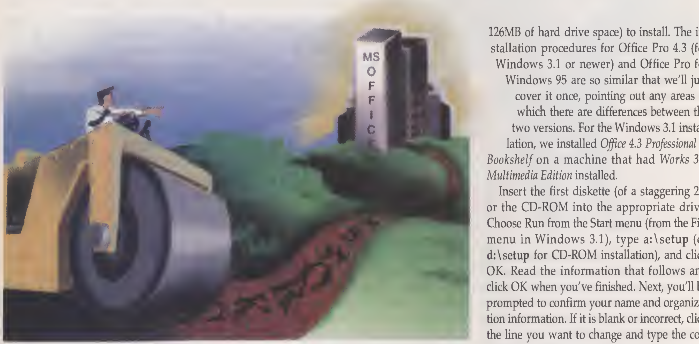
by Cindy Krushenisky



How Fast Is Fast?

When transferring one million bytes (1MB) of information, the DS3 line works much faster than the other options.

Upgrading From MS Works To MS Office



M*icrosoft Works* offers the tools to help you create the kinds of documents you need on a daily basis: word processing documents, spreadsheets, and databases. Instead of having a separate program for each type of document, Works has a TaskWizard for each document. Works also includes telecommunications software that lets you send and receive documents via your modem.

■ Why Switch To Office? While Microsoft Works offers the tools for most everyday computing tasks, at some point you may decide that *Microsoft Office* is more suited to your needs or those of your office or company. While Office works as a unit, it consists of several individual applications that you may already be familiar with: the *Microsoft Word* word processor, the *Microsoft Excel* spreadsheet, the *Microsoft PowerPoint* presentation program, the *Microsoft Access* database program, and the *Microsoft Schedule+* personal information manager (PIM). (All five programs are included in the Professional version of Office; the Standard version for Windows 3.1 lacks Schedule+ and Access, and the Standard version for Windows 95 lacks Access.)

The applications in Office offer more sophisticated options than Works, and Office adds the presentation program and PIM not offered in Works. For many business uses, the ability to create graphics presentations alone is worth upgrading to Office.

We'll demonstrate how to upgrade from Works to Office and how to move the files you created in Works into Office applications. (Upgrading to Office from Works doesn't remove Works from your computer. Thus, it isn't an upgrade in the sense of overwriting one software package with a more complete or newer version. However, once you've transferred your Works documents to Office, you probably won't need Works anymore and will be able to remove it from your system to free up space for other applications.)

■ Installing The Software. Installing Office is similar to installing any other software program, except that Office is a massive program and will take much more time and storage (between 42 megabytes [MB] and 126MB of hard drive space) to install. The installation procedures for Office Pro 4.3 (for Windows 3.1 or newer) and Office Pro for Windows 95 are so similar that we'll just cover it once, pointing out any areas in which there are differences between the two versions. For the Windows 3.1 installation, we installed *Office 4.3 Professional & Bookshelf* on a machine that had *Works 3.0 Multimedia Edition* installed.

Insert the first diskette (of a staggering 29) or the CD-ROM into the appropriate drive. Choose Run from the Start menu (from the File menu in Windows 3.1), type **a:\setup** (or **d:\setup** for CD-ROM installation), and click OK. Read the information that follows and click OK when you've finished. Next, you'll be prompted to confirm your name and organization information. If it is blank or incorrect, click the line you want to change and type the correct information. Click OK when you're ready to proceed. You'll be asked to confirm the information one more time; click OK if it's right or Change if it's not.

You'll then be given a Microsoft product identification number. Write it down and keep it somewhere handy; you'll need this number if you ever have to call for technical support. (You'll also need it to register your copy of the software.) Click OK after you've written down the number and checked it.

Setup will ask you to confirm the folder (directory, for Windows 3.1 users) you want Office installed in; the default is C:\MSOFFICE. Click OK if you want Office installed there. If you want to install it in a different folder or directory, click Change Folder (or Change Directory), choose the folder or directory you want from the list provided, and click OK.

Setup will search your computer at this point to see if you have already installed any of the components of Office. This may be the case; for example, you may have purchased a copy of Word before you realized that you wanted the complete Office suite. If you already have some components installed, that portion of Office won't be re-installed. (If you have an earlier version of one of the programs included in Office, the later version will be installed over the older version.)

Choosing What To Install. Setup will ask which type of installation you want: Typical, Compact, or Custom. (If you're installing from the CD-ROM, there will be a Run From CD option as well. This option installs some files to your hard drive but takes up much less space than the Typical option.) Most users should choose Typical, which installs all of the Office applications and the most popular components and takes up about 85MB. (The Windows 3.1 version only consumes 59MB of hard drive space.)

If you have limited available hard drive space, you may want to choose the Compact version, which installs only the applications and takes only about 42MB (31MB for Windows 3.1). If, on the other hand, you have lots of room on your hard drive and want to customize which components are installed, choose the Custom option, which is recommended only for expert users who want the option to add and remove components. The Custom version can take up a maximum of 126MB (84MB for Windows 3.1). Click the button for the installation type you want. (We chose Typical.)

You'll be asked whether you want to install optional "extras," which vary depending upon the version of Office that you're installing. If you're installing Office Pro for Win95, you'll be asked whether you want to install Microsoft Data Map, a new feature of Excel that charts data geographically and takes up 4.7MB. Click either Yes or No, depending upon your preference.

If you're installing the version for Windows 3.1, the optional features include updating graphs automatically with MS Graph 5.0, Help for WordPerfect users of Word, and Word and Bookshelf integration. Choose Yes or No for each option.

Setup then checks to see if you have enough free hard drive space. If there is not enough disk space, you'll be told that you can change your installation options, continue installation in spite of the shortage (though we can't see any reason to do so), or exit Setup. At this point, you should decide whether you want to do the Compact Installation or whether you'd rather delete unused files and/or programs from your hard drive to make room for Office. If you're going to delete extras, click Exit Setup, delete what you can, and restart setup when you're done. Otherwise, click Change Options and choose the Compact Installation option. If you don't have enough room for that option, you'll need to either remove some files from your hard drive or add memory to your system.

Most users should choose Typical, which installs all of the Office applications and the most popular components and takes up about 85MB.

If you have enough space, Setup will begin to install files to your hard drive. You'll periodically be asked to change diskettes, unless you're installing from the CD-ROM. (Be aware that this will take quite a while, particularly with the larger Win95 version of the software. It took us well over an hour to get through the file transfer process for Win95.)

After all of the necessary files are transferred to your hard drive, Setup updates your system and then you're given the chance to register your software online. (Registering your software entitles you to product support.) If you have a modem, you can click Online Registration to take care of this paperwork electronically; otherwise, fill out the form included with your software.

Click OK to acknowledge completion of Setup. In Win95, you'll go back to the Desktop; there will be several new additions to your Start menu. In Windows 3.1, you'll go back to Program Manager, and there will be a program group for Office, unless you chose to add Office to an existing program group during installation.

Transferring Files. One of the most important aspects of upgrading from Works to Office is that you can open your files from Works in Office applications. Transferring your documents to the Office application lets you remove Works from your system, which you may well need to do now that you have Office taking up a large chunk of storage. Even if you're not removing Works for whatever reason, you may find that you prefer to have some of your old documents in formats supported by the Office applications.

In most cases, working with Works files in Office applications requires that you save your Works files in a format other than the standard Works formats for word processing documents (Works WP), spreadsheets (Works SS), or databases (Works DB). To change the format in which you save a Works document, choose Save As from the File menu while you have the document open. Choose the appropriate file format from the Save As Type drop-down list (if you're using Win95) or the Save File As Type list (if you're using an earlier version of Windows). We'll talk about what formats you can use in Works and Office applications as we cover each type of document you might want to transfer.

Word processing. You can save a word processing document in Works in several formats other than Works WP. The ones that are most commonly used by other word processors are text (.TXT) and rich text format (.RTF). If you save your Works document in one of these formats, you can open it in Word without a problem.

You also can save a Works word processing document in Word 2.x for Windows format; if you do this, it will open in the later versions of Word also. (In version 3.0 of Works, the Word for Windows options are versions 1.x and 2.0.) Watch out, though; Works may trick you. Though you'll see MS Word 6.0 on the list of file types in Works 3.0, that format is one that you can only import files in, not save them.

If you want to retain a copy of the file as a Works document as well, be sure to enter a new name for the file in the File Name line of the Save As dialog box when you save it under the new format. Click Save to save the new version of the file.

Word also lets you open a Works word processing document in its original format and then save it in a new format, including Word's own format, which ends in the .DOC extension. Choose Open from the File menu in Word. In the Files Of Type drop-down list, choose Works 4.0 for Windows (or Works 3.0, if you had that version). If you're in Win95, make sure that the Look In: line lists the folder that holds the files you created in Works. For example, ours were in the DOCUMENTS subfolder of the MSWORKS subfolder in the PROGRAM FILES folder. If you're in Windows 3.1, make sure the correct folder is displayed. When you find the file you want, click Open.

Databases. You cannot use Microsoft Access to open Works databases. However, you can get around this problem by importing a database from Works into Access. To do so, you must save the database in dBASE III or dBASE IV format in Works. (Both of these formats are available in both the Windows 3.1 and Win95 versions of Works.) Then, when you open Access, just create a new database into which you can import the Works database.

To do this, choose New Database from the File menu, choose Blank Database from the New window, and click OK. Name the new database in the File New Database window by typing the name in the File Name line and click Create. This creates a blank database, with tabs for tables, queries, forms, reports, macros, and modules. The Tables will be the open tab; click New. In the New Table window that appears, choose Import Table and click OK. In the Import window, select the file you want to import. It will probably be in the C:\PROGRAM FILES\MSWORKS\DOCUMENTS folder. Make sure the Files Of Type line displays the type of file that you saved your database as in Works; otherwise, the file you want won't be listed. When you find the file, click it, then click Import. Access will display a message saying that you have successfully imported the file; click OK, then close the Import window. The imported file will be represented by an icon in the Tables window of the new database you created in Access. To open the Works database, select it and click Open.

Spreadsheets. Excel won't open Works 4.0 spreadsheets in their original format. We found Works 2.0 files as an option in the Files Of Type list in the Open dialog box in Excel, but when we tried to use that option or All Files to open a Works 4.0 spreadsheet, we got a message saying that Excel couldn't open the file.

You can, however, save a spreadsheet from Works in the Excel spreadsheet format. Choose Save As from the File menu in Works with the spreadsheet open, and under Save As Type, choose Excel SS. You'll be able to open the file in Excel by using the Open command from the File menu, choosing Microsoft Excel Files in the Files Of Type line, and finding the file you want.

Once you've transferred your Works files to your Office applications, you may choose to remove Works from your system. To do so in Win95, go to the Control Panel and click the Add/Remove Programs icon. Select Microsoft Works 4.0 from the list of software and click Add/Remove. This starts Setup; click Remove All in the Setup window. When asked if you're sure, click Yes. You may be prompted to choose whether to keep shared components such as Spell Checker; click Keep for those you want. You'll need to restart Windows after the removal takes place.

To uninstall Works if you're running Windows 3.1, run Setup by double-clicking the Microsoft Works Setup icon in the Works program group. From there, the process is the same as for Win95. ■

by Diana K. McLean

For More Information:

Microsoft Works 3.0
$55 (on diskette)
$80 (on CD-ROM—includes Bookshelf 1994)
Microsoft Works for Windows 95
$55 (on diskette)
$80 (on CD-ROM—includes Bookshelf 1996-1997)

Microsoft Office Professional for Windows 95
$599 (first-time buyer)
$349 (upgrade from competitor product)
$309 (upgrade for existing Microsoft customers)

Microsoft Office Professional 4.3 & Bookshelf
$599 (full version)
$399 (upgrade from earlier version)
Microsoft Corp.
(800) 426-9400
(206) 882-8080

Should You Switch To Office?

	Word Processing	Spreadsheet	Database	Scheduler	Presentation Graphics	Reference Materials	Communications	Graphics
Works 3.0 Multimedia Edition (for Windows 3.1)	Word Processor	Spreadsheet	Database	——	——	Link to Encarta or Bookshelf '93 if installed	Communications	MS Draw
Works or Bookshelf '95 (for Windows 95)	Word Processor	Spreadsheet	Database	——	——	Bookshelf '95 & link to Encarta if installed	Telecommunications	MS Draw
Office Professional 4.3 & Bookshelf '94 (for Windows 3.1)	Word 6.0	Excel 5.0	Access 2.0	——	PowerPoint 4.0	Bookshelf '94	MS Mail	——
Office Professional 4.3 & Bookshelf '95 (for Windows 95)	Word 7.0 for Windows 95	Excel 7.0 for Windows 95	Access 7.0 for Windows 95	Schedule+ 7.0 for Windows 95	PowerPoint 7.0 (for Windows 95)	Bookshelf '95	——	——

Here's a quick look at the features of *Works* compared to those of *Office*. (In Works, the features aren't separate programs; in Office, we've listed the version of each individual program that is part of the Office suite.) The features are similar, though the Office applications are more sophisticated than their Works counterparts. Your needs will determine which package is better for you.

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Making Your Point With PowerPoint, Part II

In last month's issue, we introduced you to *Microsoft PowerPoint for Windows 95*, one of the most popular presentation graphics programs used to create business-related documents. We covered the basics, showing you how to create and give a simple presentation. In this part of the series, we'll move beyond creating simple documents to show you how to create a more complex, polished presentation. We'll show you how to add visual interest to your slides with graphical elements, how to edit your slides beyond simple spelling and consistency, and how to refine your presentation of the material to meet the needs of your audience.

Adding Graphics. Graphics can add depth to your presentation and make it more interesting and understandable for your audience. PowerPoint makes it easy for you to add graphs, tables, drawings, and clip art to your presentations.

Graphs. PowerPoint lets you create several types of graphs using Microsoft Graph. Before you add a graph, decide which kind of graph will best present your information. For example, showing how parts relate to the whole is accomplished best with a pie chart. You could, for example, use a pie chart to show the percentage of the total company budget that is allotted to each department. On the other hand, showing how sales figures have changed over several months is best illustrated with a line chart.

The easiest way to add a graph to a presentation is to choose New Slide from the Insert menu, which will add a new slide after the one you're currently viewing. You then can choose from 24 AutoLayouts for the new slide, including a graph, an organizational chart (which shows the structure of an organization, for example), and combinations of graphs and text. Left-click the slide layout you want, then left-click OK. PowerPoint creates a new slide, with placeholders for the slide's title and for the elements you chose, whether they're graphs or text. Left-click the placeholder for the title and type the title you want.

Double left-click the graph placeholder to open a datasheet, which is a spreadsheet containing the information you want in your graph. The datasheet that opens contains sample data, which you can replace with your own information by using the arrow keys or the mouse to select the cell you want and typing in the appropriate information, either a row or column label or a data value. When you've made the adjustments you want, left-click outside the datasheet, and the graph is created with your values and labels as a bar or column graph. If you want to change the type of graph used, choose Chart Type from the Format menu and left-click the type of chart you prefer.

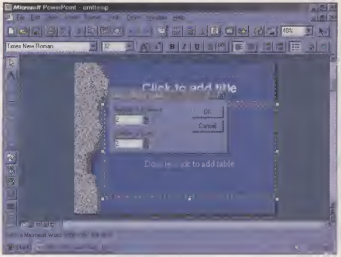
If you're adding a graph to an existing slide with the Insert Graph button or the Microsoft Graph command in the Insert menu, make sure there is enough room on the slide. (Choosing either option will open a datasheet. When you close the datasheet after entering your information, the graph will be superimposed onto the current slide. You can resize or move the graph to fit it on the slide. We'll discuss this more when we address editing graphs and tables.) In most cases, it's easier to just create a new slide for the graph.

Tables. Tables are created in much the same way as graphs. You still start the process within PowerPoint, and although the table is created as a *Microsoft Word* object, you never leave PowerPoint. (If you don't have Word on your computer, you'll be unable to create tables for PowerPoint presentations.)

Again, if you want the table to be on its own slide, choose New Slide from the Insert menu, and a new slide will be created following the one you're currently viewing. Choose the Table AutoLayout (the last one in the top row) and left-click OK. You'll see a slide similar to one used for a graph; there will be placeholders for the title and for the table. Double left-click the table placeholder to add a table. The Insert Word Table dialog box will open, and you'll be asked to choose how many rows and columns you want in the table. The table will be created with the number of cells you indicated. Insert your information by left-clicking a cell, then typing the information you want there.

You can add a table to an existing slide with the Insert Microsoft Word Table button or with the Microsoft Word Table option on the Insert menu. Again, to be sure you have enough room for the table, it's probably best to create a new slide to contain the table, with or without other elements on the slide, such as text.

You also can import tables from Word and charts from *Microsoft Excel*, if the graphic you



PowerPoint **makes it easy to insert customized tables created in** ***Micrsoft Word*** **into presentations.**

want was already created in one of those programs. We'll cover this option in-depth later, when we address how to use PowerPoint with other applications.

Drawings. The Drawing toolbar, on the left side of your workspace, contains tools that let you add your own creative masterpieces to your presentations. To see the function of each tool, pass the pointer over each tool button. There are tools to create lines and shapes, to add color to lines and shapes, to create shadows, to rotate drawn objects, and more.

Select where you want to add a drawn object; it's easiest to do this on a blank slide. (Go to the Insert menu, choose New Slide. When the New Slide dialog box opens, choose the Blank Slide option).

Left-click a tool button on the Drawing toolbar to pick up that tool; the pointer then becomes that tool. For example, if you left-click the Line tool, you can draw a line by pressing and holding the left mouse button while dragging the pointer between two points; the line will follow your path.

You also can create new slides to accommodate drawings in combination with text; choose an AutoLayout with Object placeholders, because drawings are considered objects. Double left-clicking the Object placeholder will open the same Insert Object dialog box that you saw when you chose Object from the Insert menu. From there, the steps are the same.

To add a drawing to an existing slide, you also can choose Object from the Insert menu, then choose Microsoft Drawing from the Insert Object dialog box, and left-click OK. That will open Microsoft Draw, a program that lets you create your own drawings using a variety of tools similar to those on the Drawing toolbar.

Clip art. If you're not much of an artist, you probably can find a suitable image in the Microsoft ClipArt Gallery. To add a piece of clip art, choose either Microsoft ClipArt Gallery from the options in the Insert Object dialog box or Clip Art from the Insert menu. Clip art is inserted in the same way as a drawing, and yet again, it's easiest to fit it onto a slide if you create a new slide with a placeholder for clip art.

Advanced Editing.

Last month, we showed you how to create PowerPoint presentations using the program's basic editing tools. This month, you should be ready to learn some of PowerPoint's more advanced techniques for polishing your presentations.

Changing text characteristics. You can change the look of your presentation by changing such details as the color, size, and style of the text. The most common text enhancements are found on the Formatting Toolbar, including Italic, Bold, Underline, Text Color, and Font Size buttons.

To change any text's characteristics, you first must select the text. To change the appearance of just one word, double left-click that word. To change the appearance of a set of words or a whole line, press and hold the left button while drawing the cursor across the text you want to highlight. If you're using a toolbar button to change the characteristics of the selected text, just left-click the appropriate button to change the text. After you've made the change, left-click anywhere in the work area to deselect the text.

You also can change text characteristics by choosing Font from the Format menu. Again, select the text you want to change before choosing the command. The Font dialog box allows changes to font, font size, font style (bold, italic, bold italic, or regular), color, and effects such as underline, shadow, and emboss. Make any changes you want, then left-click OK.

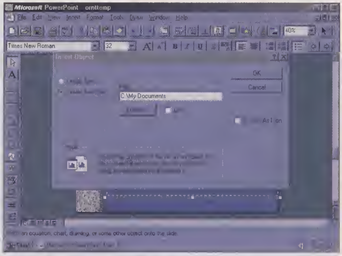
WordArt. WordArt lets you create special text effects such as transforming words into shapes. To add WordArt to a slide, display the slide you want to add the text effects to and choose Object from the Insert menu. Choose WordArt from the list of object types, and left-click OK. Type the text you want to work with in the Enter Your Text Here box, then left-click Update Display. The text will appear in the WordArt window. Use the WordArt toolbars and menus to apply the text effects you want. For example, you can shape the text into shapes such as arcs and circles using the drop-down list that initially reads Plain Text.

As with other inserted objects, make sure you have space on the slide for it or create a new slide to be sure you can accommodate the WordArt.

Editing graphs and tables. Now that you've learned how to create graphs and tables, we will show you how to change their contents and appearance.

To edit the information in a graph or table, left-click it, then make the changes you want. When you're done, left-click outside the graph or table to deselect it.

You can resize a graph or table by selecting it (left-clicking it), moving the mouse pointer over the resizing handles (displayed as white squares around the edge of the graph or table) until the pointer turns into a two-way arrow,



C:\My Documents

an equation, chart, drawing, or some other object onto the slide.

The Insert Object command lets you embed a file from another program in your presentation.

pressing and holding the left mouse button, and dragging the edge of the graph or table until it reaches the size you want. To move a graph or chart, select it, left-click it, and drag it to the new location.

You also can change the appearance of a graph by applying an AutoFormat to it. Select the graph by double left-clicking it, choose AutoFormat from the Format menu, then select the format you want.

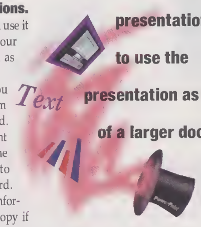
PowerPoint & Other Applications. The beauty of PowerPoint is that you can use it with other applications to add depth to your presentation or to use the presentation as part of a larger document.

Importing text and graphics. You can easily import text or graphics from another program using the Clipboard. Open the document from which you want to import the material, and use either the Cut or Copy buttons or commands to place the information on the Clipboard. (Use Cut if you don't want to leave the information in the original document; use Copy if you do.) Open your PowerPoint presentation, place the insertion point where you want to insert the imported material, and use the Paste button or command to transfer the material from the Clipboard into your presentation.

You also can use drag-and-drop editing to move material from one location to another. Open the source document and your PowerPoint presentation, and size the windows so you can view them both at the same time. Select the material you want to move from the source document, drag it to the location you want it inserted in the presentation, and drop it there.

Linking and embedding. If you want to edit the imported information in the application in which it was originally created, you will want to use either **linking** or **embedding**. If you link the information, any changes you make in either copy of the information (the source document or the copy in your presentation) will be reflected in both copies. If the document is embedded, you'll use the original application to edit the embedded information, but the changes won't be reflected in the source document.

The beauty of PowerPoint is that you can use it with other applications to add depth to your presentation or to use the presentation as part of a larger document.



To embed an entire file from another application, choose Object from the Insert menu, and left-click Create From File. Left-click Browse, find the file you want to embed, double left-click the file, then left-click OK. To edit the embedded file, double left-click it. To embed part of a file, use the Copy command in the source document, then the Paste Special command in PowerPoint. In the Paste Special dialog box, in the As box, choose the type of file you're embedding.

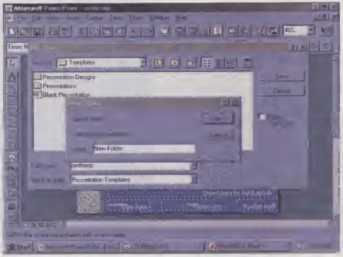
To create a link between imported data and the source document, when you paste it into your presentation, choose Paste Special from the Edit menu. In the Paste Special dialog box, left-click Paste Link. Any changes made in the source file will automatically be reflected in the copy in your presentation as well.

Exporting presentations to Word. You can transform your presentation into a Word outline, without the graphics. To do this, left-click the Report It button. The text from your presentation will be exported to Word, where you can use it as the basis for a new document.

Saving As A Template. If you have a presentation that you give in several different settings but that requires only minor changes, you may want to save that presentation as a template so you don't have to re-create it each time you need it.

It's easy to save a presentation as a template. When you're done with it, choose Save As from the File menu and enter whatever name you want in the File Name box. Then, left-click the arrow to open the drop-down list for Save As Type and left-click Presentation Templates. That automatically makes the Save In option change to the Templates folder; left-click Save. When you want to use it as a template for a new presentation, choose New from the File menu. The template you created will be in the General subfolder. (If you want it to appear in another subfolder of the Templates folder, double left-click the subfolder you want it in before left-clicking Save. You'll then need to left-click the tab for that subfolder in the New window to locate the new template when you want to use it.)

You can even create a new subfolder in the Templates folder for your own templates. To do this, left-click the New Folder button (the third button to the right of the Save In box) when Templates is the folder displayed in the Save In drop-down box. When the New Folder dialog box opens, enter the name of your new folder in the Name line, and left-click OK.



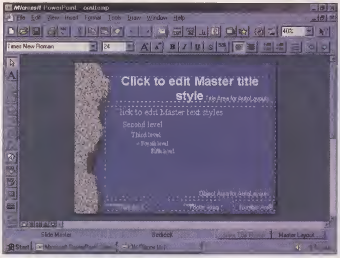
File name: omtemp

Save as type: Presentation Templates

Name: New Folder

***PowerPoint* not only lets you save your presentations as templates, but also lets you create a new subfolder in the Templates folder for them.**

Meet The Masters. There are four kinds of Masters in PowerPoint: Slide Masters, Title Masters, Handout Masters, and Notes Masters. Masters determine the components in each of these parts of your presentations; there is a complete set of Masters for each presentation. Changing the masters changes the your presentation's


Microsoft PowerPoint - omtemp
File Edit View Insert Format Tools Draw Window Help
40%
Times New Roman
24
Click to edit Master title style
Title Area for AutoLayouts
Click to edit Master text styles
Second level
Third level
Fourth level
Fifth level
Object Area for AutoLayouts
Footer Area
Number Area
Slide Master
Bedrock
Master Layout...
Start

You can edit the Masters to change the basic elements and style of the slides in your presentation.

look. For example, you can add your company name to the slide master so it will appear as a footer on each slide you create. (Because there is a set of Masters for each presentation, the changes you make will only be reflected in that presentation.)

To view the Masters, choose Master from the View menu, then left-click the type of Master you want to view.

Changing default title and body text formats. The Masters have placeholders for each style element. For example, the Slide Master has placeholders for title style, text styles, and date, footer, and slide number areas. To change one of these text elements, left-click the appropriate placeholder. You then can alter the style of the selected text by changing the font, font size, or text characteristics using the buttons on the toolbar or the Font command in the Format menu, which offers the same options. The changes you make will be reflected in the placeholder text so you can see what it will look like before leaving the Master and working on a presentation.

Changing slide elements. To change an element, left-click the appropriate placeholder. For example, to add your company's name to the bottom of each slide in the presentation, double left-click the Footer Area placeholder, type your company's name, and left-click again anywhere in your workspace.

After working with the Masters, choose Slides from the View menu to return to the presentation.

More Presentation Techniques.

Hidden slides. When making a presentation, there may be information that you don't want to include but need to have available if the audience asks for it. This information can be included in hidden slides, ready to be used if a question arises.

To add hidden slides to your presentation, you first must create the slide in the same manner you would create any other slide. Once the slide is created, choose Hide Slide from the Tools menu. (You also can go into Slide Sorter View, select the slide you want to hide, and left-click the Hide Slide button on the toolbar.)

To reveal a hidden slide during your presentation, press *H* if the hidden slide is the next slide in your presentation. If the hidden slide is not the next one in the presentation, you must click the right mouse button, point to Go To, and left-click Slide Navigator. A list of the slides in your presentation, including hidden slides, will appear; left-click the slide you want to show, then left-click Go To.

Timing the presentation. If you prefer to have PowerPoint advance through the slides in your presentation automatically instead of manually, you can set timings for each slide. (This feature is especially useful if the presentation is going to be displayed for an audience to read instead of being presented by a speaker.)

To set the timing for a presentation, open the project in Slide Sorter View. Save the presentation under a new name so that you retain the original version without automatic advancement timings. Left-click the Rehearse Timings button (the one with the stopwatch on it). The slide show will begin, with a dialog box open to keep track of the length of time each slide is shown and the length of the entire presentation. Left-click anywhere on the slide to advance to the next slide at the point you think is appropriate; if you advance to the second slide after five seconds, that will be the length of time PowerPoint displays the first slide. Do this for each slide in the presentation. When you've finished, PowerPoint asks if you want to save the settings; left-click Yes.

Shortcut keys. No matter how well you've organized your material, it's possible that during your presentation you'll need to move among the slides in an order you did not plan. PowerPoint's shortcut keys let you move among slides, not just forward or back one slide at a time.

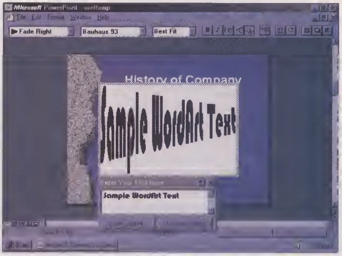
To use shortcut keys while giving a presentation, press F1 to open Slide Show Help. You'll see a list of available shortcut keys. For example, to go to a certain slide, press the number of the slide, then press ENTER.

Looking Ahead. Next month, in the last part of our series, we'll cover more advanced techniques, including multimedia effects, sharing your documents with others electronically, and presentation follow-up tools included in PowerPoint. ■

by Diana K. McLean

For More Information:

Microsoft PowerPoint for Windows 95 7.0
Microsoft Corp.
$339 (retail); $129 (upgrade)
(800) 426-9400
(206) 882-8080



WordArt lets you create special text effects for your presentation.

Microsoft Word 6.0

Formatting Basics

6.0 FOR WIN

WORD PROCESSING

You don't have to be a computer whiz to run *Microsoft Word*. The program adjusts to your word processing skills, handling everything from no-frills letters to long, multisection documents with charts and graphics. But just because you can't tell a point from a pica, or don't know the difference between leading and kerning, doesn't mean you can't learn a few formatting tricks.

Consider several of Word's formatting features, including Change Case, Tabs, and the Format Painter. Knowing what each one does will lighten your word processing workload while increasing your control over document layout.

A Case In Point. The Format menu's Change Case command is especially handy when you've typed in a heading or title capitalizing the first letter of each word. If you want the title in all uppercase letters:

1. Position the cursor to the left of the first character in the heading/title.
2. Slide the pointer slightly to the left of this character, until it becomes an arrow.
3. Point the arrow at the line, then click the left mouse button to select the entire line.
4. Choose Change Case from the Format menu, then select Uppercase from the resulting list. All highlighted characters convert to uppercase.

It's easy to apply this Uppercase formatting to other headings (as long as you do it before clicking the mouse or entering additional text). Follow these steps:

1. Scroll to the next heading by clicking the single scroll arrow to the right of the open document window.
2. Repeat steps 1 to 3 above.
3. Select Repeat Change Case from the Edit menu or press CTRL-Y.

A Leader Among Tabs. Knowing how to manipulate tab options also saves formatting time, especially when you're working with columns of text and numbers. You actually have two ways to control tab settings: the horizontal formatting ruler (located just above the open document window) and the Tabs command.

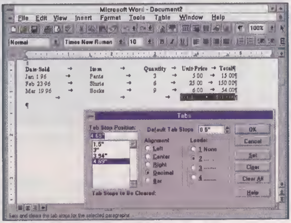
To work with tab settings on the formatting ruler, make sure the ruler is in view (if it isn't, choose Ruler from the View menu), then:

1. Select the portion of text to be formatted.
2. Click the Tab Alignment button at the far left of the horizontal ruler until the icon for the desired tab marker appears. Options include: Left, Right, Decimal, and Center. Placing a left tab stop extends selected text to the right of the tab marker; placing a right tab stop extends the text to the left of the marker. A center tab directs Word to center selected text at the tab stop. Decimal tabs align the decimal point in selected numbers at the tab.
3. After choosing a tab marker, place it by clicking the bottom edge of the ruler.
4. Press the TAB key to position the text.

If there is no text, begin typing. Word automatically aligns the text correctly. To remove a tab stop from the ruler, click and drag it off the ruler.

Selected text can have several kinds of tab markers. This flexibility is useful for lining up items in a list. For our document (see graphic), we aligned the Quantity column on a center tab and the Unit Price and Total columns on a decimal tab.

Use the Format menu's Tabs command (or double-click any tab stop on the ruler) to open the Tabs dialog box. This lets you set tab stop positions with greater precision. It also provides additional options. For example, if you want to fill the empty space to the left of a tab stop with a series of characters that focus a reader's eye, Word lets you select dots, dashes, or solid lines as tab leaders.



Date Sold	Item	Quantity	Unit Price	Total
Jan 1 96	Pants	3	5 00	15 00
Feb 23 96	Shirts	6	25 00	150 00
Mar 19 96	Socks	9	6 00	54 00

Tab Stop Position: 4 69"
1.5"
3"
3 94"
4 69"
Default Tab Stops: 0 5"
Alignment: ○ Left ○ Center ○ Right ● Decimal ○ Bar
Leader: ○ 1 None ● 2 .... ○ 3 ------- ○ 4 _____
Tab Stops to Be Cleared:

Sets and clears the tab stops for the selected paragraphs

***Microsoft Word* has several tab options that provide greater control over the layout of columnar data.**

Quick Formatting Tips. After laying out a section of text with a particular font, type size, and type style, or configuring document text with special margin settings, hanging indents, or bullets, you can use a click-on button shortcut to apply that formatting to another section of your document. To do this:

1. Use the mouse to highlight the formatting you want to copy. If you want to apply borders, hanging indents, alignment, and so forth, highlight the entire paragraph including the ending paragraph marker.
2. Click the Format Painter button (which looks like a paintbrush) on the Standard toolbar. The cursor changes to an I-beam with paintbrush. The status bar at the bottom of the screen displays instructions that guide you through task completion.
3. Drag the mouse across the text to be formatted, then release the mouse button to apply the formatting.

To learn about the other basic formatting features, check your online help or read "Working With Microsoft Word 6.0" in our May 1995 issue. ■

by Carol S. Holzberg, Ph.D.

Quattro Pro 6.0

@DATE Functions

Need to complete a task but don't want to construct a long formula to get it done? Consider *Quattro Pro*'s library of functions, which are tiny programs that do calculations behind the scenes and display their results in your worksheet. If you use Quattro Pro to schedule projects, meetings, and events, you'll get hooked on the time-saving benefits of a special subset of functions that work exclusively with dates.

Making @DATE Functions Work. You can use the more basic @DATE functions to display information known to your PC, such as today's date. They also can do a heap of math for you, calculating the number of days or hours between two dates (along with specified times) you provide. Though we can't cover them all here, we can show you how to use an @DATE function and where to find the 30-plus @DATE functions available.

To explore how they can provide more power and control, let's try one of the more commonly used @DATE functions called @BDAYS, which determines the number of working days between two dates you specify:

1. Open a worksheet.
2. Click the cell where you want the @DATE function's output to be displayed.
3. Click the Input Line to activate the buttons next to it. (The Input Line is the text box where you enter information to be placed in a cell.)
4. Now click the button that displays the @ symbol. The Functions dialog box will open, displaying a list of available functions.
5. Click the Date item in the Function Category list, then click the @BDAYS item on the Function list. Click OK to return to your worksheet. You'll see the beginning of an @DATE function statement in the selected cell.
6. Click the Input Line, then move the cursor to the end of the visible text. You'll enter date information there.

   To calculate the number of days between two dates (including the end date), you need to provide those two dates to Quattro Pro. You do so inside parentheses like this: **@DATE(96,10,5)**, where the year, month, and day are separated by commas. We'll use this date as the start date in our example. So far, our @BDAYS function looks like this:

   @BDAYS(@DATE(96,10,5))

7. Now we add the end date, in parentheses, separated from the beginning date with a comma, like this:

   @BDAYS(@DATE(96,10,5),@DATE(96,10,20)

   Note that each date uses its own @DATE function to calculate a binary number from the date you provide. The two dates are separated with a comma and enclosed in another set of parentheses that tells the @BDAYS function where to look for the dates on which to perform its task.
8. Press ENTER so the program can replace its display of this @DATE function with the number of workdays that occur between the two dates, inclusive. Don't forget to save your work!

Our example generates a total of 10 business days. Some @DATE functions can be further tailored to consider holidays off as well as Saturdays and Sundays you plan to work, lunch time off, and so on.

Look at the table on this page for the names and brief descriptions of the most commonly used @DATE functions. Once your peers see how much more "intelligent" you make your spreadsheets, you're sure to be elected the new Quattro Pro guru at your workplace! ■

by Robert Mullen

Popular @DATE Functions

@ABDAYS	Provides future date if you tell it how many ***business*** days occur between now and then.
@ACDAYS	Provides future date if you tell it how many ***calendar*** days occur between now and then.
@BUSDAY	Displays a date if it's a business day or selects the ***next*** available business day to display.
@CDAYS	Tells you the number of ***calendar*** days between two dates, including the second date.
@EMNTH	Tells you the last day (1 to 31) in the month.
@HOLS	Gives you the number of holidays between two dates, *except for* holidays that occur on weekends.
@ISBDAY	Tells if the given date is a business day (Monday through Friday).
@LBDAY	Tells you the date of the ***last*** business day of a month if you choose the month.
@MDAYS	Tell Quattro Pro the month and year; it tells you the number of calendar days in that month. (Especially good for determining leap years several years in advance for project planning.)
@NBDAY	Displays the first available business day ***following*** a date you provide.
@WKDAY	You give it the date; it tells you the day of the week.

PageMaker 5.0

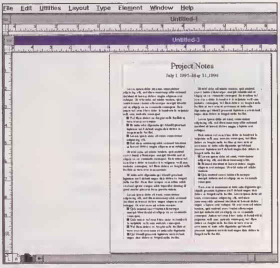
Setting Paragraph Specifications

When working with lengthy text and layout that calls for consistency, you need the Type menu's Paragraph command, which lets you set values for indents, paragraph spacing, and alignment.

Before creating paragraph specifications, select with the Text tool the paragraph(s) you want to change or modify one paragraph by clicking the I-beam cursor somewhere within it. Then select the Paragraph command to open the Paragraph Specifications dialog box, which includes four categories of settings. The Indents setting indents a paragraph's entire left side, entire right side, or first line only, while Alignment lets you align, center, or justify type. Paragraph Space puts a measure of space before or after a paragraph. Dictionary is used in spell checking and hyphenation.

A fifth setting, Options, controls the flow of text from one column or page to another. The following options have to be preset when working with lengthy text:

- Keep Lines Together—Keeps the paragraph from being split over graphics with text-wraps and by page or column breaks.
- Column Break Before and Page Break Before—Ensures that the paragraph starts a new column or page.
- Include In Table of Contents—If you are working with a long document for which you need to create a table of contents, you can use this setting to mark paragraphs, headlines, and subheads for inclusion.
- Keep With Next—Keeps heads and subheads from appearing alone at the bottom of a column by making sure they move with one to three lines of the next paragraph.
- Widow Control—Removes **widows** (lines consisting of one word at the end of a paragraph) by placing a paragraph's last one to three lines on a new page or column.
- Orphan Control—Removes **orphans** (a preceding paragraph's last line that starts a new column or page) by adding one more line to the specified number of lines that should remain at the bottom of a column or page.



Project Notes

July 1, 1995–May 31,1996

Create paragraphs that have uniform indents, spacing, and alignment with the Paragraph command.

Creating Rules. Rules let you set off relevant information, such as quote boxes in newsletters. (Unlike underlines, which are font attributes that limit you to a program's settings, rules are design elements that let you call attention to text by using lines of varying widths, lengths, and colors.) Also use them to highlight and separate equally important pieces of information that are unrelated. Click Rules to activate the Paragraph Rules dialog box, which has these options:

- Rule Above Paragraph and Rule Below Paragraph—May be used together.
- Line Style and Line Color—Provide submenus where you control the thickness or select the color of a rule.
- Width Of Text—Creates a rule that is as wide or narrow as the space occupied by the paragraph's last line.
- Width Of Column—Creates a rule that is as wide as the text block or the column occupied by the text block.
- Indent—Controls the distance between the rule from the text block's edges.

NOTE: These rules can be modified only through the Paragraph command, not with the Pointer tool.

Click the Paragraph Rules dialog box's Options button to open the Paragraph Rules Options dialog box. Here, you control the position of the rule from the top or bottom of the type's baseline.

- Top—Positions the top rule vertically. Place the rule higher by entering a value in the box. Doing so may change the **leading** of the paragraph's first line. (Leading is the amount of space between lines in a layout, often expressed as a percentage of the type size.)
- Bottom—Positions the bottom rule vertically. Place the rule lower by entering a value in the box; this may change the leading of the paragraph's last line.
- Align To Grid—Horizontally aligns the baselines of text across columns. This is helpful when you have different type sizes, leading, and paragraph spacing for heads, subheads, and body text. Before using this option, select the paragraph causing the misalignment.
- Grid Size—Ensures baseline alignment of text by matching the grid to the leading. Select from the submenu or enter the leading point size.
- Reset Button—Returns to the default settings and deselects Align To Grid.

Spacing Attributes. After finishing your paragraph settings, return to the Paragraph Specifications dialog box. Click Spacing to open the Spacing Attributes dialog box, which lets you specify word, letter, and line spacing.

PageMaker's default settings are good enough for body text and display type. If you're still not sure what your layout needs, it's probably safer to use the default settings to avoid distorting the font's appearance. ■

by Annepely P. Dakay

Kid Friendly Computer Accessories Designed in Fun Colors

Why can't kids have computer accessories too? For the family, the children's need to use a computer is a major motivating factor in purchasing a PC. Kids need a PC for doing homework, and to explore new learning activities.

Kids also need a place to store and protect their CD ROMs and disks. Why mix up their stuff with mom and dad's or worse with little brother Timmy? At SRW, we recognize the little needs of kids and have designed their accessories in fun, distinct colors and have even created fun animal stickers to add personality to each disk storage item. What can be more fun?

Kids Smart™ accessories are

- "Kid Friendly"—easy to open and close, safe, and rugged
- Separates children's software from parents and siblings software using fun colors
- Teaches responsibility by storing and protecting their own disks and CD ROMs
- A natural complement to the PC purchase and purchase of "Kidware" software.

KIDS SMART™

SRW®

SRW Computer Components Co., Inc.
(800) 547-7766 • 1402 Morgan Circle, Tustin, CA 92680

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And Other Computer Retailers Nationwide

Word Pro 96

Versioning

You're working on a sales report for the vice president of marketing to present at the board of directors' meeting. After compiling information and writing the original report, you need to get feedback and suggestions from the rest of the sales group before giving the vice president a draft.

So now you have to print copies of the report for everyone, let them manually mark changes on the report's pages, type those changes into your document, and save it under a new file name to protect the original version, right?

Wrong.

Word Pro's **versioning** team tool lets you create a single document that contains multiple versions. To make the review process much less painful, simply save the file to a shared network drive (or on diskette), give it to your team members, and ask them to create a new version before they edit the document. Then compare the versions and create a version that incorporates everyone's changes.

NOTE: You can use another team tool, TeamConsolidate, to compare the versions. We'll cover that feature next month.

Using File Versions. Access the versioning tool through the Versions For File dialog box. To bring this on-screen, choose the File menu's Versions option. The dialog box contains the file name in its title bar; lists version names, editors, and remarks; and has command buttons down its right side. Use the command buttons to create, delete, and rename a version, or save it as a separate file.

Whenever you want to protect the information and formatting of a file, create a new version before editing. Open the document for which you want to create a version, bring up the Versions For File dialog box, then left-click Create Version.

The Create Document Version box appears. Word Pro assigns a default name for your version. If you want to change that name, type a name in the Version Name field. You also can type a description in the Editor's Remark field. Return to the Versions dialog box by left-clicking OK. Word Pro will tell you that creating a new version does *not* automatically save the file but archives previous edits as an old version. This old version becomes a read-only file; you edit the new version. Left-click OK to remove this message. Then left-click OK again to return to the file. (You also can create a version by choosing Version from the Create menu.)

Deleting A Version. Display the document containing the version you want to delete, then open the Versions For File dialog box. Highlight the version you want to delete and left-click Delete Version. Word Pro will ask you to confirm the deletion. Left-click Yes, then left-click OK.

Benefits of Versioning

The Versioning team tool provides several benefits, including the following:

- ✓ Because edited versions are stored in a single file, you can easily manage and share a document without having to remember several file names or locations.
- ✓ Versioning saves hard drive space by saving the differences between versions, not entire versions.
- ✓ With the information provided in the main portion of the Versions For File dialog box, you can quickly track the history of versions, including the names of editors, remarks from editors, and dates of edits, file creation, and last edits.
- ✓ When a new version is created, the former version becomes a read-only file, so the original document and its subsequent changes are protected and archived.
- ✓ When you open a file, the most recent version is displayed.
- ✓ If you want to alter an old version, you can save it as a separate, editable file.
- ✓ Versions share objects (such as OLE objects, drawings, and charts). Any changes you make to the objects are made in all versions. ☐

There may be occasions when you want to rename a version. For example, imagine that Bob and Lynn saved their versions of your sales report using Word Pro's default names—Version 3 and Version 4. To make your life easier, you want to call one *Lynn* and the other *Bob*. To change a version name, display the document containing the version and choose Version from the File menu. In the Versions For File dialog box, highlight the version you want to rename and left-click Rename Version. In the resulting dialog box, type a new name in the New Name For field. Left-click OK. Then left-click OK again.

You also can save a version as a separate file so you can edit a file's earlier versions. (It is also something you must do to use the TeamConsolidate tool.) Display the document, choose Versions from the File menu, highlight the version you want to save, then left-click Save As File.

Word Pro will display its Save As dialog box, prompting you to name the file and provide directions on where to save it. After entering this information, left-click OK to return to the dialog box. Left-click OK again. When you save a version as a file, earlier versions are also saved to the file. For example, if you save Version 5 to a separate file, Word Pro will save the Original Version, Version 2, Version 3, and Version 4 as part of the file.

Versioning is just one of the team tools in Word Pro that makes working on a document as a group much easier. You'll appreciate the ability to let each team member work on the document online, without the hassle of printed copies and handwritten editing marks and additions. ■

by L. Johnson

Microsoft Excel 5.0

Locating & Replacing Data

Do you ever get lost in a worksheet, wondering how you can find certain information? Or perhaps you have a large worksheet that needs a formula updated in multiple locations. Fortunately, *Microsoft Excel* 5.0 has ways to help you locate cell data, formulas, and specific locations.

Those who think Find and Replace commands are only for word processing programs will be happy to learn Excel can effectively use them to quickly find information and efficiently update your worksheets.

Finding. The Find command locates text you've typed in cells, even if it's in the middle of a formula. For example, you can search for @IF or +B15 as well as more straightforward text such as Totals.

To display the Find dialog box, press CTRL-F or select Find from the Edit menu. Type the search text in the Find What field. Then choose Find Next. Excel selects the first cell it finds matching the characters you typed. If you have just one cell selected when you start Find, Excel searches the entire worksheet. When you select multiple cells, Excel searches only those cells.

Excel keeps the Find dialog box displayed until you close it so you can repeat the search by clicking Find Next. Pressing the SHIFT key while clicking Find Next will return you to the previous occurrence of the text.

Replacing. Using the Replace command, you can efficiently locate and replace formulas, numbers, or labels with other data in one or more worksheets. Imagine you have a worksheet for 200 employees that lists their salaries. Congress raises the minimum wage, so you need to update cells for those employees working at that rate. Replace lets you quickly update cells with the new wage.

This command is even more powerful when you need to update numbers within a formula. For example, you might have a large worksheet that includes the current interest rate as part of multiple formulas. When the interest rate changes, you can efficiently update the entire worksheet using Replace.

First, select the area of the worksheet in which you want to replace characters. If only a single cell is selected, Excel searches the entire worksheet. To display the Replace dialog box, press CTRL-H or select the Edit menu's Replace command. Type the text, number, or formula you want to locate in the Find What field, then type the replacement text in the Replace With field. Click Find Next to locate the first occurrence of the text. When Excel locates the first cell that matches your criteria, you can choose Replace to update the cell or Replace All to update the entire selection or worksheet.

Which Do I Use?

The following table shows which command is most effective to use:

TO:	USE:
Quickly locate text strings in a cell	Find
Update cell labels, formulas, or numbers	Replace
Locate a type of cell contents such as formulas or notes	Go To, Special
Assign a name to a cell or group of cells	Range Name box

Range Names. You also can assign a range name to a cell or cells. (A range name is used in place of a cell address and is easier to remember because you create the name.) Range names are useful for several reasons, such as for jumping quickly to a specified range or as part of a formula.

For example, imagine you have a large worksheet with your Net Profit in cell CC2033. Rather than trying to remember the cell address, you can assign CC2033 a range name, such as Net_Profit. And =Income-Expenses is easier to remember than =A25-A23.

To assign a range name, select the cells you want to name. Next, click the range name box on the left end of the formula bar and type in the name for the selected cells. Excel lets you use up to 255 characters for a name. It's best if you stick to letters, numbers, and underscores when assigning names. Press ENTER when you're finished.

To jump quickly to a range name in your worksheet, click the drop-down arrow to the right of the range name box. Select the range name from the list.

Alternately, you can choose Go To from the Edit menu (or press F5) to display the Go To dialog box. Double-click the range name from the list box.

Go To. Although it's most common to use the Go To command to locate cells with range names, you also can use it to indicate cells with certain content types. For example, you quickly can find all cells with formulas in your worksheet or only locate those that have notes in them.

In the Go To dialog box, click Special to list the types of cell contents—notes, formulas, constants, and so forth. Select the cell type you want, then click OK. Excel highlights all cells that conform to the type you designated.

Once you've mastered these powerful tools, the days when you scrolled aimlessly around worksheets looking for data will be just a memory, and you'll be amazed at the increase in your productivity! ■

by Linda Bird

Lotus 1-2-3 For Windows 5.0

Adding Graphics

The worksheet data has been entered, the chart created, but there is a number you want to draw attention to. An arrow would be nice, maybe some text, perhaps a circle drawn around it in red. With *Lotus 1-2-3*, that's not just wishful thinking. You can enhance worksheet data with graphics such as lines, arrows, shapes, and text blocks.

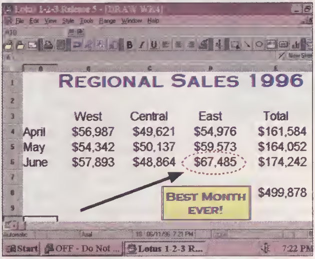
Creating Graphics. Arrows can point out important data. Lines can be used to create shapes such as triangles. To draw a line, arc, or arrow, choose Draw from the Tools menu, then select Line, Arc, or Arrow. Move the mouse pointer to where you want to begin drawing, click and drag across the worksheet to where you want the line to end, and release the mouse button. For horizontal, vertical, or 45-degree lines or arrows, press the SHIFT key as you drag.

In our example, we chose to draw an arrow. We clicked below and to the left of the number we wanted to emphasize (June sales for the Eastern region), dragged up and to the right, and released the mouse button.

To surround areas of your worksheet or to create designs such as logos, use rectangles, ellipses, squares, and circles. From the Draw submenu, select Rectangle, Rounded Rectangle, or Ellipse. Click the mouse where you want to begin drawing the shape, drag across the worksheet to where you want the shape to extend, and release the mouse button. To draw a square instead of a rectangle or a circle instead of an ellipse, press the SHIFT key while you drag.

In our example, we drew an ellipse around the June sales figure for the Eastern region.

To draw an open or closed shape consisting of straight or freehand line segments, choose Polyline or Polygon from the Draw submenu. Click where you want to begin drawing, drag to where you want to end the line segment, and release the mouse button. Hold down the CTRL key while dragging your mouse to draw a freehand line segment. Double-click to complete the polyline or polygon. You don't have to draw the last segment on a polygon; Lotus 1-2-3 will automatically connect the last segment with the first.


Lotus 1-2-3 Release 5 - [DRAW.WK4]
File Edit View Style Tools Range Window Help
Start
OFF - Do Not ...
Lotus 1-2-3 R...
7:22 PM

REGIONAL SALES 1996

	West	Central	East	Total
April	$56,987	$49,621	$54,976	$161,584
May	$54,342	$50,137	$59,573	$164,052
June	$57,893	$48,864	$67,485	$174,242
				$499,878

BEST MONTH EVER!

Drawn objects such as an arrow can bring attention to important data in your *Lotus 1-2-3* worksheets.

If you have a steady hand, you can draw freehand to create any shape. From the Draw submenu, choose Freehand, click the mouse where you want to begin drawing, and drag the pointer across the worksheet. Release the mouse button when you want to quit.

Entering Text. To add comments or emphasize important information, you can use text blocks. To do so, choose Text from the Draw submenu and move the mouse pointer to where you want to begin. Click to create the text block in default size or click, drag, and release to create the size block you want. Enter text by typing or by pressing SHIFT-INSERT to paste text from the Clipboard. When you are finished, click the worksheet. To edit text in a block, select the block and double-click to start editing. Edit the text and click the worksheet when finished.

When we used the Text option, we clicked below the June sales figure for the Eastern region and entered the words "Best Month Ever!". Then, we clicked the worksheet outside the text block.

Editing Objects. Elements can be selected, copied, deleted, moved, sized, and styled. When you click a drawn object, small squares called handles appear. Clicking and dragging these handles resizes objects. Clicking and dragging on any other part moves objects.

Copy a selected object by choosing Copy from the Edit menu. Select a cell where you want to paste the object and choose the Paste command. Delete a selected object by pressing DELETE.

To enhance an object, right-click to display a drop-down menu and make selections, or double-click to display the Lines and Color dialog box. Text block enhancements temporarily disappear in editing mode but reappear when you click the worksheet.

In our example, we used the Lines and Color dialog box to redefine styles, attributes, and sizes. For starters, after right-clicking the arrow, we selected Width to increase its width and visibility. For the ellipse, we changed the edge style, width, and color. The text block was where we made full use of the options in this dialog box. First, we clicked and dragged the handles to resize the block. Then we right-clicked, chose Font and Attributes, and changed the font face to Copperplate 18 point bold and switched the color to blue. After clicking OK, we right-clicked the text block again, chose Lines and Color, and changed the edge width, color, and background color. ■

by Diane Kaye Walkowiak

Colors

By Fuji

(Of course.)

Hey, who turned on the color in the computer products aisle? Fuji. Who else? Their 3.5" 2HD Formatted Rainbow Packs are a brighter, more efficient way to organize your data. And they're a lot more fun, too, of course.

Fuji

Computer Products

WordPerfect For Windows 6.1

Inserting Sound Clips

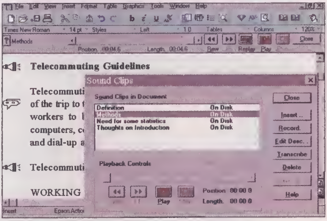
WordPerfect 6.1 document doesn't have to be restricted to the written word. You can enhance your documents with sound effects, music, and voice recordings. With the seemingly limitless possibilities offered by this feature, you can:

- Create multimedia presentations, educational materials, and tutorials.
- Record dictation or notes to listen to later when working on a document.
- Embed reminders in unfinished projects.
- Use sound effects to register your reactions to someone's work.

To use the Sound feature's full capability, you must have a sound device (usually a sound card) installed in your computer. If you want to record sound files, you'll also need a microphone or other input device.

Depending upon your hardware, you can use two types of sound files with WordPerfect: Musical Instrument Digital Interface (MIDI) or digital audio (.WAV). MIDI is a standard for communicating musical information between devices such as synthesizers and computers. These files do not actually store the sound but store instructions that enable the computer to re-create the sound. You cannot record MIDI files with WordPerfect. Digital audio files work like an audio tape, only the sounds are digitized and stored on a diskette or your hard drive. These files produce a high-quality sound but are larger and require more disk space than MIDI files. You can, however, record sound into .WAV files using WordPerfect.

Inserting Clips. To insert a sound clip, position your cursor where you want the sound clip to appear, open the Insert menu, and select the Sound option. In the resulting dialog box, click Insert. If you want, type a description of the sound clip in the Name text box. In the File text box, type the file name of the sound file to be added or click the button with the file folder on it to select from a list. Select a storage location for the sound file, either storing it as part of the document (which makes your document size larger) or storing it separately. Click OK to return to your document. An icon appears in the left margin to mark the sound clip's location.



Telecommuting Guidelines

Telecommuti
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and dial-up a

Telecommuti

WORKING

Sound Clips in Document

Definition On Disk
Methods On Disk
Need for some statistics On Disk
Thoughts on Introduction On Disk

***WordPerfect* lets you add multiple sound clips—including notes to yourself—to your documents.**

If there is more than one sound clip on a line in your document, the icon in the left margin changes to reflect multiple clips. The sound clip's description can be changed by choosing Sound from the Insert menu and selecting the sound clip you want to edit from the list of sound clips in the document. Then click Edit Desc, make your changes, and click OK and Close to return to the document. A sound clip can be removed from a document by selecting its name in the Sound Clips dialog box, clicking Delete, then Yes. The clip will remain on disk but will no longer be in the document.

Playback. Once a sound clip is inserted into a document, it can be played by clicking its icon. Another way to listen to clips is to double-click a name in the Sound Clips dialog box. At the bottom of this box are playback controls you can use while playing a clip, including Play, Stop, Rewind, or Fast Forward. The total length of the clip and the current position are also displayed.

If you click Transcribe in the Sound Clips dialog box, a feature bar will be displayed, as shown in our example. From this bar, you can play, rewind, fast forward, and replay clips by clicking the icon for the sound clip and then using the buttons and controls on the Transcribe feature bar. Discontinue display of the feature bar by clicking the Close button.

Making Your Own Noise. If you have the necessary hardware, you can record your own sound clips to insert into documents. From the Sound Clips dialog box, select Record to launch the Windows Sound Recorder. Your Windows documentation contains detailed information about using Sound Recorder.

From the sound recorder, click Record to begin recording and click Stop when you are done. Make editing changes or add special effects (such as adjusting the speed and volume, adding an echo, or putting the sound into reverse). After recording and adjusting your sound clip, choose Save As from the File menu. Save the file and close the sound recorder to return to the Sound Clips dialog box. Insert the sound clip you have just created by clicking Insert and specifying the name of the file.

The Sound feature lets you create informative documents that come alive at the touch of a mouse. It also provides a simple way to add commentary to someone's work. They might not appreciate that raspberry sound effect, but they'll know how you feel! ■

by Diane Kaye Walkowiak

REMEMBER TO SHARE THESE CARDS

You know better than anyone how frustrating it can be when you need help with your computer and there's no place to turn. *First*, you turned to your computer manuals only to find them full of techno-babble. *Then*, you tried the other computer magazines and found them full of advertising and useless information.

Remember this feeling?

And then you found *PC Novice*, the only magazine that will give you computer information in an easy-to-read format that is full of useful computer information.

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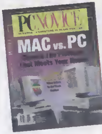
☐ Yes ☐ No 3) provides information for computing in your home AND office? For example: PC Operating Instructions, Family Computing, At The Office, and Plugged In, just to name a few monthly departments.



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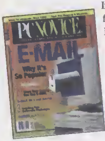

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. . . we'd like you to help us help others. Chances are your friends, family members, and co-workers are having the same feelings you did at one time about computers . . . *FRUSTRATION.*

This is your chance to help end their frustration by introducing them to *PC Novice* magazine. Simply detach the RISK-FREE subscription cards and pass them along to your friends. If after receiving their first issue they decide *PC Novice* is not for them, they can write "Cancel" on the invoice, and we will cancel their subscription.

Quicken Deluxe 5.0

Managing Investments Online

5.0 FOR WIN

PERSONAL FINANCE

Riding the waves of the stock market's bears and bulls can be tough, but tracking the performance of your stock portfolio doesn't have to be. *Quicken Deluxe* 5.0 contains numerous features designed to help you obtain stock market information and follow the performance of your stocks and mutual funds.

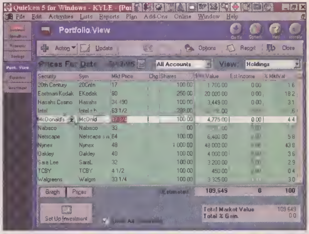
When tracking stocks and mutual funds, you'll use Quicken's Portfolio View, which lets you go online and monitor the fluctuating market value of your investments. To use this feature, your computer needs a modem. To enter the Portfolio View window, click the Investments icon at the HomeBase.

Entering Investments. You'll notice the Portfolio View window looks similar to the other account management areas throughout Quicken, which is one of the program's strengths. Its familiar interface should make it easier for you to use. Before you can track your investments, you must list them in the Portfolio View window.

Before creating your investment accounts, decide whether you want to group any of your stocks. For instance, you might have a group of investments you plan to use to purchase a vacation home, while another group will provide retirement income. Quicken gives you the option of tracking the performance of each of these investments as a group. If you prefer, you can track each stock individually, or you can view all listed stocks as a single group.

Entering each stock is fairly easy. Click Set Up Investment in the lower-left corner of the window, and Quicken will walk you through the process with its EasyStep feature. Click Next to advance through each screen. If you want to group some of your investments, place those investments in the same account. Make sure you type the symbol of your stock exactly as it appears in the stock listings, or Quicken won't be able to find the stock when it attempts to update your portfolio. When you enter the number of shares you own and their cost, enter the cost of all of the shares rather than each share's individual cost. (Quicken's instructions are not too clear in this area.) Entering information for each stock requires about three minutes.

***Quicken Deluxe* tracks the value of your stocks and mutual funds with its Portfolio Price Update service.**



All Accounts

View: Holdings

Security	Sym	Mkt Price	Chg	Shares	Value	Est Income	% MktVal
20th Century	20Cntn	17		100 00	1 700 00	0 00	1 6
Eastman Kodak	EKodak	80		250 00	20 000 00	0 00	18 2
Harrahs Casino	Harrahs	34 490		100 00	3,449 00	0 00	3 1
Intel	Intel s h	63 1/2		200.00	[illegible] 00	[illegible]	[illegible]
McDonald's	McDnld	47 3/4		100 00	4,775 00	0 00	4 4
Nabisco	Nabisco	33		[illegible] 00	[illegible] 00	[illegible]	[illegible]
Netscape	Netscaps s n	64		100.00	6,400 00	[illegible]	5 8
Nynex	Nynex	48		1 000 00	48 000 00	[illegible]	43 8
Oakley	Oakley	40		100 00	4 000 00	[illegible]	3 6
Sara Lee	SaraL	32		100 00	3 200 00	[illegible]	2 9
TCBY	TCBY	4 1/2		100 00	450 00	[illegible]	0 4
Walgreens	Walgrn	33 1/4		100 00	3 325 00	[illegible]	3 0
Estimated					109,645	0	100

Total Market Value 109 649
Total % Gain 0 0

After you enter all your stocks, Quicken updates the Portfolio View window. If you need to edit the stock information (other than the share price), click Action in the upper-left corner and select the appropriate change from the menu. For instance, if you buy additional shares of a stock already in your portfolio, you would highlight the stock listing, open the Action menu, and select the Buy option. To edit the share price, highlight the stock listing and type the new market price.

Tracking Your Portfolio. Once you've entered the proper information into the Portfolio View window, Quicken gives you two methods for updating the values in your portfolio. You either can type the numbers manually, recording them from a newspaper's stock listings as described above, or you can have Quicken pull the values from the Internet and insert them for you. The second method saves most people some time because it requires no data entry, and it helps you eliminate typographical errors from your account listings. You will encounter some charges, though. We'll show you how to go online and update your portfolio values.

To have Quicken activate your modem and find the updated stock prices, click Update. You can try Quicken's Portfolio Price Update service three times for free before you must subscribe to the service. Portfolio Price Update costs $2.95 per month, which lets you update your portfolio (containing up to 200 stocks and mutual funds) six times. Each update beyond the sixth costs 50 cents each. The stock prices are delayed 20 minutes while the market is open.

When you click OK in the Update Portfolio Prices window, Quicken takes control. It automatically activates your modem and dials Quicken's toll-free number. Quicken then updates your portfolio with the latest prices, all within a few minutes.

We had some difficulty making Quicken recognize our modem's location and speed. If you experience this problem, open the Online menu and select the Set Up Modem option. You'll need to manually tell Quicken your modem's speed and which communications port it is installed in. If you decide to subscribe to the Portfolio Price Update service, you must complete the Intuit Membership form. Open the Online menu and select the Intuit Membership Set Up option to fill out the form.

If your needs extend beyond portfolio updates, Quicken's Investor Insight feature may be just what you're looking for. Look for October's tutorial when we'll show you how to use this online tool to access financial news, advice, and information on the stock market and investments. ■

by Kyle Schurman

The Config.sys File:

What Does It Do?

Your computer doesn't know much. In fact, it forgets most of its identity every time the power is shut off.

The main DOS startup file responsible for teaching your computer who it is when it wakes up in the morning is called Config.sys, short for CONFIGure the SYStem. Config.sys is an ordinary text file stored in the root directory of a computer's **boot drive**, the drive on which the computer looks for its operating system. After DOS loads its most basic core programs into memory, it goes looking for Config.sys to fill in the missing pieces.

Config.sys concerns itself mainly with memory, an expensive and precious computer resource that must be managed wisely. Your PC can run without a Config.sys file, but it might move much more slowly, and certain programs might not open.

DOS also knows from Config.sys which **device drivers**, the small programs that let the computer interact with other hardware, to load into memory. Too many device drivers can eat up valuable space, but without a device driver, a particular piece of hardware, such as a special mouse, might not work.

Finally, Config.sys tells DOS which command processor to load. This is the program that accepts commands from the user and decides how to act upon them. Without some type of command processor, the computer becomes an unusable hunk of metal and silicon.

It's easy to glance at a computer's Config.sys file, but before doing anything, it's a good idea to make a backup. To save a copy of your Config.sys file to a diskette, type

```
copy c:config.sys a:config.sys
```

at any C> prompt. This will copy your Config.sys file to whatever diskette is in the A: drive. Put it aside just in case.

Now we'll get busy. As we said before, Config.sys is stored right in your computer's root directory on the boot drive. For most computers, this is the C: drive. To make sure you are in the root directory, type **cd** and press ENTER. Repeat this until the command prompt reads C> without any directory names after it. If you like, type **dir**, which stands for the DIR command, to see what files are lurking about. They may scroll by too fast to read, but one of them should be Config.sys. (To slow down the scrolling, type **dir /p**.)

To see the contents of your Config.sys file, type

```
type config.sys
```

and press ENTER. The file should be displayed on the screen followed by another C> prompt. Gaze upon your Config.sys file for a moment. Your computer reads these words each time it boots up. Most of these commands may seem unfamiliar because, unlike the commands in the Autoexec.bat file, these only can be used in Config.sys files. We'll explain most of them in a bit.

There's no way to change the contents of your Config.sys file from a TYPE listing such as this. Altering Config.sys requires some type of text editor. DOS 5.x and newer includes an easy-to-use, full-screen editor called EDIT. Older versions of DOS use a horrible line editor known as EDLIN. If you're using Windows, you can open Config.sys with Notepad.

To open Config.sys in EDIT, type

```
edit config.sys
```

and press ENTER. The same file that you just viewed with the TYPE command should now appear in a word processing-like environment with File, Edit, and other pull-down menus strung across the top of the screen. Once again, before making any changes to Config.sys, be sure you've saved a backup somewhere. If you have a backup, be brave: All mistakes can be corrected.

Inside Config.sys. It isn't easy to find two Config.sys files that look exactly alike because few computers are exactly alike. Different hardware and software setups can alter a Config.sys file, making your file a sort of "fingerprint" for your machine.

However, there are a number of things that every Config.sys file must accomplish. On the next page is a sample file containing some of the most common Config.sys elements we took from a computer with DOS 6.22 and no other software loaded on it.

Your Config.sys may or may not look like this one, but it probably has at least a few lines in common. Not all of these lines are necessary in all computers, so don't worry if you're missing several. What matters is that your computer works the way it is.

Device drivers. The first task of our Config.sys file is to load device drivers and other programs that reside in memory during the entire time the computer is on. Device drivers are small programs that tell the computer how to use a particular piece of hardware or certain types of software. Config.sys' DEVICE command takes care of this important job.

The first device driver in our sample Config.sys file is Himem.sys, the **extended memory** manager. Basically, this program tells the computer how to use extended random-access memory (RAM), which is the memory beyond the first 640 kilobytes (KB). You shouldn't need Himem.sys if you have less than one megabyte (MB) of RAM, if your central processing unit (CPU) is a 286 or lower, or if you use DOS 4.0 or older without Windows.

Next up is Emm386.exe, the **expanded memory** manager. Emm386.exe is used on computers with 386 or higher CPUs. This memory manager deals with upper memory and can turn some extended RAM into expanded RAM. Emm386.exe only can be used if you also use the Himem.sys line. If your Himem.sys is in the WINDOWS directory, use the Emm386.exe in the WINDOWS directory as well.

A Sample Config.sys File

Following is an example of a Config.sys file. Each line's meaning is explained in detail in the accompanying article.

```
Device=C:\DOS\Himem.sys
Device=C:\DOS\Emm386.exe Noems
Buffers=15,0
Files=30
DOS=UMB
Lastdrive=E
FCBS=4,0
Devicehigh /L:1,12048 =C:\DOS\Setver.exe
DOS=High
Stacks=9,256
```

Our Emm386.exe line ends with the NOEMS command. This tells DOS to forget about enabling expanded RAM but to go ahead and manage the rest of upper memory. If you don't have any older programs that use expanded RAM, the NOEMS command can free up more memory for other programs.

You might notice that all of these Device lines require the full path name to reach the drivers. In this case, Himem.sys is located in the DOS directory. If you are using Windows, the driver is probably in the WINDOWS directory. Without the path name spelled out in Config.sys, the computer will not be able to locate the correct files.

On some systems, you may find a Setver.exe line. Setver.exe is a program that makes a newer version of DOS pretend to be an older version. This is so older programs can run in a newer DOS. If your DOS is older than version 5.0, you shouldn't need a Setver.exe line. Newer versions might need this line depending upon what software you want to run. If you don't run any old programs, removing the Setver.exe line can free up some memory.

Config.sys might also load the Ansi.sys device driver, which is a screen driver that controls cursor movement, screen color, and keyboard definitions and is required by some programs and some dial-up bulletin board systems (BBSes). You can try deleting this line if you want and see if any error messages result when you try to run your programs.

Besides the device drivers that deal with memory, DOS version, and display, you will probably find a few others. For instance, one of our computers includes the Config.sys lines

```
Device=C:\SCSI\Aspi2dos.sys /D /Z
Device=C:\SCSI\Aspicd.sys /d:aspicd0
```

These lines load the device drivers for the particular kind of CD-ROM drive in our computer. Your computer may have lines somewhat similar to these that load drivers for your CD-ROM drive, sound card, scanner, modem, network card, and other hardware. Most of these lines are added automatically by the setup programs that come with new devices, although some may require you to manually type in the commands. If you or someone else has removed or switched hardware on your system, you might want to make sure no obsolete drivers are being loaded into Config.sys.

If you run the DoubleSpace or DriveSpace disk compression programs, you might find extra drivers that deal with these programs. It's probably a good idea not to change any of these settings, especially if things seem to be working. Other device drivers covered in this manual include Interlnk.sys, Ramdrive.sys, Ega.sys, and Display.sys.

Load 'em high. Devicehigh is similar to Device, and almost any device driver loaded with a Device line can be loaded with a Devicehigh line instead. Devicehigh tells DOS to load a driver in the upper area of memory instead of in the cramped base of RAM. This opens more conventional memory for running other programs. Devicehigh only can be used after Himem.sys and Emm386.exe are loaded, which is why you usually see Devicehigh lines toward the end of Config.sys.

To make sure Device and Devicehigh are being used in the best way possible for your computer, you can run DOS' **MemMaker** program, which is available in version 6.0 and newer. If you've never run MemMaker before or if you have recently installed a new device, try out this valuable program. (MemMaker is a DOS utility that, when run, looks at your system and finds the optimum configuration.)

Drivers aren't the only programs that can be shooed away from base RAM. DOS can be loaded into extended memory with the DOS=High line. Left to its own preferences, DOS will load itself into scarce conventional memory. The DOS=High line must be preceded in Config.sys with the Himem.sys loading line, or DOS won't know where to find the upper memory.

If you are running Emm386.exe, you also can move some extra DOS utilities to upper memory by changing DOS= High to read

```
dos=high, umb
```

Again, MemMaker, if it's available, is probably the best way to make these sorts of changes.

Buffers. These are temporary storage areas in a computer's memory. Whenever DOS reads information from the hard drive for a program, it stores that information first in memory buffers. Each buffer is the size of a disk sector, which is often 512KB. After the data is stored in buffers, it is passed along to the program.

This might seem like an unnecessary extra step, but buffers save a lot of time in the long run. Programs often request the same information over and over again. With buffers, there is a good chance that DOS will be able to find that information in the superfast RAM rather than resorting to the relatively slow hard drive. Every trip to the hard drive that DOS can avoid slightly speeds up operations. The combined effect can be dramatic.

In a similar fashion, information the program wants to write to the hard drive is also stored in buffers before being passed along to the drive. Then, if the program wants to access this information again, it is only a short RAM trip away.

The buffers are usually located in conventional memory. If DOS is loaded into extended memory, the buffers will be created there as well unless there isn't enough room.

Config.sys' BUFFERS command tells DOS how much memory to devote to this buffering. If too many buffers are used, finding the information contained in them can take longer than using the hard drive, defeating their purpose. Also, computers with little RAM to spare can decrease performance by devoting too much memory to buffers. The best balance for most users is a Buffers value of around 20, but this varies from machine to machine. A value of 15 is recommended for those using SmartDrive. If you don't have a Buffers line in your Config.sys file, the default is 15 for systems with more than 512KB of memory.

Some applications automatically change your Buffers line during their setup procedure. If this is the case and everything seems to be working, it's probably best to leave these values as they are. However, nothing tragic will result from a bit of experimenting.

Space also can be allocated to look-ahead buffering. This means that whenever DOS retrieves information from the hard drive, it reads a little more information than it needs, which could potentially reduce future disk access calls. In this case, the line might look like this:

```
Buffers=20, 5
```

The first number is the number of standard, or read-write buffers, while the second number designates look-ahead buffers.

Files. Some applications require a minimum number of file handles to be specified in Config.sys using the FILES command. **File handles** are the names the computer uses to refer to the open files it is using. The number of files a computer can open at once is limited to the number of file handles that can fit in the special memory area reserved for that purpose. A common number of file handles is 30, designated by a line like this:

```
Files=30
```

Some programs may add such a line to Config.sys during installation. The default is eight, and the maximum is 255. Each handle after the first eight takes up 39 bytes of memory.

Some older applications demand File Control Blocks (FCBS) rather than file handles. You can see our sample Config.sys file contains lines for both so it will be able to deal with either type of program. The FCBS number can be anywhere from one to 255; the default is four.

Stacks. DOS also must set aside a portion of memory to support certain types of hardware. This is accomplished with the STACKS command. Some programs may add a Stacks line to your Config.sys or change the one you already have. Stacks are a bit more technical than some of the other aspects of Config.sys and should probably be left alone by most users.

Shell. DOS must know where to find the **command processor file**, the program that interprets commands typed in at a prompt or from a batch file. The program included with DOS for this purpose is Command.com, which is usually located in the root directory of the boot drive. If Command.com has been moved for some reason or you want to use a different command interpreter, you need to tell DOS with a Shell line in Config.sys.

On some computers, the Command.com file is located in the DOS directory. The appropriate Config.sys line for this case would be the following:

```
Shell=C:\DOS\Command.com
```

Lesser-used Commands. Rounding out the rest of the Config.sys commands, in alphabetical order:

- A Break=On line tells DOS to pay attention to the CTRL-C or CTRL-BREAK key combinations that users must sometimes hit to escape from certain programs. BREAK can help you out with balky software, but it slows down operations. If you don't need it, don't use it.

Computers with little RAM to spare can decrease performance by devoting too much memory to buffers.

- COMMENT is a strange little command that doesn't get much use. It defines a string that can be followed in other Config.sys lines by extra text that is intended for humans rather than the computer.
- The COUNTRY command is for use with foreign computer setups. This command won't cause DOS to print in different languages, but it can enable keyboards and displays to type and print in different languages.
- The DRIVPARM command can reconfigure a disk or tape drive's parameters such as sector size. It is slightly scary and not recommended for anyone who isn't thoroughly familiar with DOS.
- INSTALL loads up certain **terminate-and-stay-resident (TSR)** programs. These are small applications that are available even when other programs are running. INSTALL is meant to be used mainly with lesser-known commands such as DOSKEY, FASTOPEN, KEYB, NLSFUNC, and SHARE. INSTALLHIGH does the same job as INSTALL but loads the TSR into upper memory.
- Lastdrive=X, where X equals a letter between A and Z, tells your computer the maximum number of drives—hard drives, diskette drives, tape drives, etc.—it can access. LASTDRIVE can be useful if you use a RAM drive or add extra real drives. Don't, however, specify more drives than you need.
- The simple NUMLOCK command tells the computer whether the NUMLOCK key on the keypad should be "on" or "off" at startup. Numlock=On means on, Numlock=Off means off.
- The REM command has the same sort of idea as the COMMENT command. Any line beginning with REM will not be acted upon by the computer. This can be a useful debugging tool because you can use it to void lines without erasing them altogether.
- Before DOS 6.0, SET was a command frequently seen in Autoexec.bat files. This command changes the variables used by various DOS programs. The variables control how the programs work. SET is often used to tell DOS what directories to search when looking for a program file. In recent versions of DOS, SET has been used as a Config.sys

command, although it still can be found in Autoexec.bat.

- SWITCHES sets a few environmental variables. One of the most common uses gets rid of the "Starting MS-DOS . . ." message that appears for two seconds every time you boot up your computer. If you are tired of the waiting each day and are sure you will not need to hit F5 or F8 to bypass Config.sys (see below), the line Switches /F in the Config.sys file will eliminate the wait.

If you are running Windows NT or Windows 95, you probably won't find these commands or any others in your Config.sys file. In fact, you may not find a Config.sys file at all because Microsoft's latest operating systems don't require one, although some programs or hardware might still use it. In many cases, loading the old drivers in an ancient Config.sys can actually slow down Win95. Make a backup Config.sys and then try deleting the whole thing.

Disaster Recovery. When you don't have Win95, your computer will run inefficiently or may not work properly with a faulty or missing Config.sys file. If you have a Config.sys but think something is wrong with it, one way of pinning down the problem is to tell DOS to prompt you before performing any Config.sys command. In prompting mode, the computer will ask you during startup whether each command should be skipped or performed. This lets users run lines they know are correct while bypassing suspect commands. Prompting also can come in handy if you need to change your computer's configuration for a certain session but don't want to change the Config.sys file for good.

You can make the computer prompt you in this manner by hitting F8 when the screen says "Starting MS-DOS . . ." DOS then will show you each line of your Config.sys file followed by a [Y, N]?. Hit the *Y* key if you want to execute that line or the *N* key if you want it skipped. Once Config.sys is complete, DOS will move to the Autoexec.bat file.

It's possible to set up individual lines in Config.sys to prompt every time the system is started. For instance, if you wanted the option of whether to load a particular device driver, you could change the line

```
Device=C:\DRIVERS\Driver.sys
```

to

```
device?=c:\drivers\driver.sys
```

The question mark always is inserted directly following the command word. It must be placed before any of the switches, equals signs, and other characters.

If you want to bypass the entire file without any prompting, press F5 when the "Starting MS-DOS . . ." appears on-screen during bootup. The computer will perform none of the commands in the Config.sys or Autoexec.bat files.

If you bypass Config.sys and your Command.com file isn't in your root directory, DOS may not be able to find it. If this happens, it will ask you to type in the file path to Command.com. Usually, this is **c:\dos\command.com**.

Bypassing an entire balky Config.sys file is especially useful if you want to restore a backup copy of a previous, working Config.sys. To do this, bypass the files and wait for the C> prompt to appear. Let's say our backup is named Config.bak and is stored on a diskette in the A: drive. In this case, you should type

```
copy a:config.bak c:config.sys
```

to restore your old file. Then reboot, and your computer should start up normally.

From Scratch. If your Config.sys file has been completely erased or screwed up beyond recognition, you might have to start over. As we said, your computer can run without a Config.sys file, but not to its full potential. Some devices may not work, and memory won't be well managed.

If you are running Windows NT or Windows 95, you may not find a Config.sys file at all because Microsoft's latest operating systems don't require one, although some programs or hardware might still use it.

The first step to take if you don't have a backup is to type in a simple, starter Config.sys file. If you're using a 286-based computer, try this one:

```
device=c:\dos\himem.sys
dos=high
device=c:\dos\setver.exe
device=c:\dos\ansi.sys
buffer=15
files=50
stacks=9,256
```

This basic file contains the commands that most 286s probably need. You can create this file using EDIT or the COPY CON command. Remember to save it in the root directory. On a 386 or higher computer, we can get a little fancier. Type in the sample file we listed in "A Sample Config.sys File" at the beginning of this article.

Once you have a basic Config.sys file back in your root directory, reboot the computer. If you're using DOS 6.0 or newer, run MemMaker to make sure your memory is being used in the most efficient way possible.

Lastly, look through software manuals to see if any of your programs need special lines in Config.sys to run correctly. If you can't find any manuals, you might try re-installing the software. Many programs make automatic changes to files such as Config.sys. Before you go to that trouble, however, you should run the applications you use to make sure re-installation is necessary. If everything seems to work all right, your Config.sys probably doesn't need tweaking.

Config.sys Menus. If you're using DOS 6.0 or newer, you can alter your Config.sys to present you with menus and submenus of different configuration options every time you start your computer. This comes in handy if you have different programs with different memory needs or if one computer is shared by several users.

Let's take a simple example first. Say we only use our computer for two applications: a database and a word processor. The database must have expanded memory on hand, but when we use the word processor, it runs better with more extended memory. We want to tell Emm386.exe to forget about making expanded memory whenever we use the word processor.

Now look at the following Config.sys file:

```
[menu]
Menuitem=Word, Word Processing
Menuitem=Data, Database
Menudefault=Word

[common]
Device=C:\DOS\Himem.sys
DOS=High
Buffers=15,0
Files=25

[word]
Device=C:\DOS\Emm386.exe Noems

[data]
Device=C:\DOS\Emm386.exe

[common]
DOS=UMB
Stacks=9,256
```

Whenever we boot this machine, DOS will go through its startup routine and then present us with a menu that looks something like this:

```
MS-DOS 6.22 Startup Menu

1. Word Processing
2. Database

Enter a choice:
```

If we hit the number 1, DOS performs the commands under the [word] block, then skips the [data] block and moves on to the second [common] block. No expanded memory is used. Pressing number 2 does the opposite: Expanded memory is enabled, and we are ready for the database.

The Menudefault line in the [menu] block ensures that pressing any other number will have the same effect as pressing number 1. You also can set DOS to go with the default selection if no key is pressed for a certain amount of time. For instance, the line

```
Menudefault=Word, 10
```

would make DOS select the [word] block after 10 seconds.

It is also possible to define submenus within menus. A possible scenario where this feature might come into play would be if two people shared the same computer. One person, Tom, uses the options described above while another person, Rhonda, must load French drivers for special international correspondence.

Rather than display all of Tom's options at the first menu, we could set up one menu to determine which person is using the computer and then proceed from there. To accomplish this, we'll use a Submenu= line as below:

Config.sys Colors

Add a combination of these colors to your Config.sys file and change the background color of a menu as well as type color.

1 black	⬛
2 blue	🟦
3 green	🟩
4 cyan	🟦
5 red	🟥
6 magenta	🟪
7 brown	🟫
8 white	⬜
9 gray	⬜
10 bright blue	🟦
11 bright green	🟩
12 bright cyan	🟦
13 bright red	🟥
14 bright magenta	🟪
15 yellow	🟨
16 bright white	⬜

```
[menu]
Submenu=Tom, This is Tom
Menuitem=Rhonda, This is Rhonda
Menudefault=Tom, 10

[common]
Device=C:\DOS\Himem.sys
DOS=High
Buffers=15,0
Files=25

[tom]
Menuitem=Word, Word Processing
Menuitem=Data, Database
Menudefault=Word

[rhonda]
Country=033,850 C:\DOS\Country.sys
Devicehigh=C:\DOS\Display.sys Con=(,850,1)

[word]
Device=C:\DOS\Emm386.exe Noems

[data]
     Device=C:\DOS\Emm386.exe

     [common]
     DOS=UMB
     Stacks=9,256
```

This Config.sys file would give Tom the choices he needs and Rhonda the ability to work in French without loading unnecessary drivers every time the computer is booted.

Another menu command is INCLUDE. If Rhonda in the above example wanted to run the word processor every time she logged on, we could put the line

```
include word
```

immediately after the Display.sys line in her [rhonda] menu. Whenever she logged on, her international drivers would be loaded, and the computer then would perform the actions listed in the [word] block before moving on to the [common] block.

Once you've got menus working the way you need them, it might be time to have some fun with Config.sys fashion colors. The MENUCOLOR command can change the background of a menu as well as the type color. Each color is identified by a number code between 1 and 16. (See "Config.sys Colors" for the number codes.) For example, if we wanted a white background with red text, we could put the line

```
Menucolor=5,8
```

at the beginning of our Config.sys file. The first number always stands for the text color while the second number identifies the background color. This is a sure way to liven up Config.sys, as if it wasn't already exciting enough. ■

by Alan Phelps

Ruggedized Portables Go Where Others Fear To Compute

Have you ever watched a portable computer die? It's not a pretty sight, but unfortunately, it occurs all too frequently. It doesn't take much to kill an average laptop or palmtop computer. A short drop onto concrete, a little rain, a little sand, some extreme temperatures. One minute you have a functional high-tech dream tool, the next an expensive doorstop.

Most portable computer companies don't manufacture their machines to withstand these tough conditions, so users must handle their computers with care. That's fine if you only need your portable computer for occasional plane trips and weekends at home. But more and more people are finding they need computers they can take into the field, literally.

From farmers to utility personnel to members of the armed forces, users are demanding machines that can survive the rough environments they work in on a daily basis. Manufacturers have responded to this need with a new breed of mobile computers, often dubbed "ruggedized portables."

"Our average customers are those people who have used notebooks in harsh environments and found they go through two to five machines a year. They realize they can save money by buying a rugged notebook," Don McCook says. McCook is the vice president of marketing and business development at Dolch Computer Systems, the maker of the NotePAC and several other ruggedized portable computers.

The NotePAC is a 100MHz 486DX machine with 4MB of RAM, a 500MB hard drive, a diskette drive, two PC Card slots, and a machined aluminum case (instead of plastic) that can withstand a wide range of environments as well as the occasional crash onto an unforgiving surface.

While a good ruggedized portable like the NotePAC (priced at $7,995) costs quite a bit more than a regular portable with the same capabilities, the higher price is usually worth it to any user who knows the frustration of having a PC stop functioning during an important assignment. McCook asks how much money your time, effort, and information are really worth. If your computer dies an untimely death in the field, how much money do you lose then?

The higher cost isn't just a reflection of the product's specialty nature, either, he says. The process of creating one of these tough machines is significantly more time- and cost-intensive than that of a regular portable computer. A lot of work goes into each machine, from designing to building to testing.

Making The Grade. Before a company such as Dolch starts piecing together a new ruggedized portable computer, it first takes a look at the national, international, and military specifications for durability, McCook says.

The maker decides which of these specifications it wants the machine to meet, based on the market it wants to reach, and begins the design from there. When it's all over, the finished computers must complete testing requirements to display those specifications.

For example, the National Electrical Manufacturers Association (NEMA) has a set of standards concerning environmental conditions such as rain, snow, dust, and chemicals. The NotePAC meets NEMA's standards for a 4 rating, meaning it is impervious to dust and dirt, spraying water, and dripping liquids.

Companies also use military standards to measure environmental as well as shock and vibration resistance. For example, the NotePAC meets the Military Standard 810 E (MIL-STD-810E) shock rating. That basically means the PC is Marine-proof, McCook says.

To build a ruggedized portable that meets the specifications set down by these groups, manufacturers must make design decisions for the inside and outside of the computers.

The Brick Or The Shock. We found that when it comes to designing the inside of a ruggedized portable, manufacturers use at least two methods to make sure their machines can withstand a very serious shock: a drop onto concrete from a height of at least three feet. One school of thought prefers the brick method. This basically means locking everything inside down to a solid metal chassis (solid as a brick). The entire body dissipates the severe shock or vibration. The second method involves the use of shock mounts to secure the internal components, allowing each component to dissipate the shock individually.

The designers at Dolch used the brick method in designing the NotePAC. According to McCook, one of the keys to building a solid machine is picking out good internal components that can handle their share of the shock. When designing a ruggedized portable, a manufacturer often selects a device such as the hard drive not just for its performance, but also for its ability to withstand shock, vibration, and temperature extremes.

Another key is making sure the motherboard and all its attachments are locked down completely within the case. Dolch secures the NotePAC's motherboard in twice as many places as the board in a typical portable. And everything attached to that motherboard—except for the CPU, which is wedged between the motherboard and the outer shell—is soldered into place to make sure nothing comes loose in a fall. This limits upgradability to some degree (Dolch must perform most upgrades), but McCook says the machine makes up for it in durability.

Finally, when workers put the machine together, they must scrutinize every detail, he says.

"You can have a wonderful, incredibly rugged aluminum chassis design, but if the screws that hold the board down aren't torqued to the right level, then vibrations could loosen them, and you lose all the benefits," McCook says.

The Tough Stuff

Finding a ruggedized portable isn't as simple as stopping in at the local megastore and grabbing one off the shelf. To make it a little easier, we've compiled a list of some of the toughest products on the market.

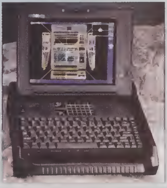
Amrel Technologies' Rocky

The Rocky, one of the few Pentium-based ruggedized portables we found, comes with a sporty yellow rubberized casing that just begs for a soaking. It also has a standard eight megabytes (MB) of random-access memory (RAM), an 800MB hard drive, and a light weight of about 6.5 pounds.

Cost: $3,995
(800) 882-6735
(818) 303-6688
http://www.amrel.com

FieldWorks' FW 5000 Series WorkStation

The FW 5000 has a rubber-encapsulated magnesium frame and a system of internal shock mounts that help absorb impacts. The computer, one of the few rugged models that is easily upgradable, can withstand a shock of up to 100 Gs while operating. For those rugged mobile users who insist on good sound, this unit also includes a 16-bit sound card and integrated speakers. The total package weighs about 10 pounds.



Cost: $4,995
(888) 343-5396
(612) 947-0137
http://www.canaska.com/fw.htm

Dolch Computer Systems' NotePAC

The NotePAC is a 486-based metal notebook sealed against the elements and capable of surviving substantial shocks. It also handles vibrations well and has a removable hard drive that can survive a 40-G shock all by itself. This machine is a real brick, and it feels like one, weighing in at about 14 pounds.

Cost: $7,995
(800) 538-7506
(510) 661-2220
http://www.dolch.com

The inside of a FW5000 PC from FieldWorks Inc. looks quite a bit different from the NotePAC's. Lonnie Helgesson, design manager at FieldWorks, says each of the internal components is secured to a shock-dissipating inner layer with special polymer mounts that also absorb shock. Essentially, each component is a free-floating device, so when a severe shock occurs, it must work its way through the magnesium alloy case, the various shock layers, and the individual shock mountings before it actually reaches the internal devices.

All that shock mounting adds up to one tough machine, Helgeson says. In FieldWorks' tests, they've done everything from throwing the 5000 from a tree to driving over it with a Jeep. And it just keeps working.

Both the brick and shock mount methods have their proponents. It seems to be a simple matter of opinion as to which really works better. Both systems seem to do the job. And whichever method manufacturers use to make the inside of a ruggedized portable tough, they share many of the same methods for preparing the outside of the machines.

A Rugged Exterior. One of the first things manufacturers must do when making a ruggedized portable is to make sure the forces of nature at work on the outside can't get to the inside of the machine. Keeping out moisture, dust, sand, and anything else that might blow the PC's way is one of the most important features of a good ruggedized portable.

Grit, grime, and gunk often find their way inside typical portables through the keyboard. The NotePAC eliminates this possibility with a one-piece, sealed rubber keyboard. The pointing device is an equally impenetrable single piece of rubber. Both will work well at either end of the thermometer. Every other opening on the machine, such as the slots for the removable hard drive or the PC Cards, has O-ring sealed covers that users can thumb-screw into place to ensure maximum protection.

And if something should make its way inside, the company also coats the internal components individually to provide another line of resistance, McCook says.

Weigh The Costs. As mentioned earlier, ruggedization comes at a steep price, and not just in terms of cost. In addition to having higher price tags, most ruggedized portables are heavier, harder to upgrade (with some exceptions), and oftentimes less advanced technologically than their wimpy counterparts.

But to the typical ruggedized portable user, those costs are probably pretty easy to deal with when compared to the thought of a standard portable computer dying a horrible death at precisely the wrong time. Doorstops are handy, but not at the cost of productivity. ■

by Tom Mainelli

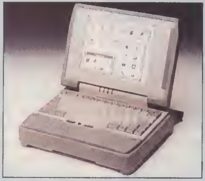
Husky Computer's FC-486

The FC-486 is a one-piece, 5-pound unit constructed of die-cast magnesium that can withstand a 6.5-foot drop, as well as total immersion in water. The FC-486 also addresses the need for tougher screens with a display that can handle the substantial impact of a 1-inch steel ball dropped from a height of 6 feet.

Cost: $2,999
(813) 530-4141
Fax: (813) 536-9906

Itronix's XC 6000 Cross Country

The XC 6000, in addition to being one tough computer, also acts as a high-performance communications center, with options that include a 14.4 kilobits per second (Kbps) fax/modem and internal ARDIS, RAM, and CDPD radio modems that allow wireless communications. The computer itself is a 486-based machine with a 340MB hard drive, at least 4MB of RAM, and a standard weight of about 6.5 pounds.



Cost: $4,941
(800) 441-1309
(509) 624-6600
http://www.itronix.com

Teklogix's GT 486 N

The GT 486 N is the product of Badger Computers, a company recently purchased by Teklogix, a wireless communications company. That combination means the tough little GT has some unique communications options, including an ARDIS radio modem with an integrated antenna. The unit weighs about 6.5 pounds.

Cost: $4,995
(800) 633-3040
(606) 371-6006
http://www.teklogix.com

Texas Micro's Hardbody Handheld PC

The 3-pound Hardbody is the commercial version of The Grunt, the Army's "soldier computer," designed to withstand the rigors of battlefield use. The 486DX-based machine comes with 8MB of RAM and a rugged 260MB hard drive. You can input information using a pen, or in a pinch, your finger.

Cost: $3,995
(800) 627-8700
(713) 541-8200
http://www.texmicro.com

Will Multiplayer Games Make A Net Killing Online?

Ever since the 1800s when Babbage's Difference Engine—the world's first computer—was cobbled together with a hand-turned crank and punch cards, we've been fascinated by the idea of an artificial companion. A silicon sidekick. A byte buddy. Something to keep us company, tell stories to, swap information with, and most importantly, play with.

At first, the games for computers were as rudimentary as the vacuum-tubed beasts and other primitive machines that ran them. Tic-Tac-Toe. Checkers. Chess. Pong. But as computers muscled up, the gaming galaxy did too, swiftly evolving into complicated flight simulators, combat strategy games, and action arcade adventure shoot-'em-ups.

Now, Nintendo, Sega, and Sony are The Big Three in video game companies. But after years of video-gaming dominance, their growing rivalry is being challenged by unlikely foes—the new multimedia PC and online games.

After years of unfulfilled promises, today's PCs have the necessary speed, graphics, hard drive space, and sound performance to compete as a viable game platform, and according to the market research firm Dataquest, 27.8 million multimedia PCs will be in American homes by the end of this year. Add that to a robust online community expected to grow to 1.2 billion users in the next two years or to the 40 million U.S. households expected to have Internet access by the year 2000, and you can understand why gaming executives are drooling. How much more untapped revenue lies waiting is anyone's guess, but the possibilities are staggering.

Which explains why the gaming industry is jumping onto the multimedia PC bandwagon. Of the 1,700 new titles shown at the recent Electronic Entertainment Expo, 61% were for the PC, with the rest divvied up for every other type of game platform. Holy *Mortal Combat*!

Everybody's kung fu fighting for their chunk of the expanding, $3 billion video game industry. But what makes the outcome of this battle different is that a critical gaming element is no longer missing. Up until now, all the glittering technology, competing platforms, and game genres couldn't solve die-hard gamers biggest complaint: Playing against a computer just isn't satisfying. It's either too easy or too hard. PCs lack the killer instinct of a human opponent. They don't care if you taunt them. They don't react to bragging or bellowing. Like "Star Trek's" android Data, computers are incapable of human emotion and only can mimic human reactions. The bottom line? It just isn't as much fun playing alone.

New Game In Town. Certainly, the gaming industry has tried several solutions. By adding expensive hardware, several players can compete on the same system, be it video game or PC. Newer splatter-rama games such as *Doom* boast direct modem-to-modem connections for two players. Even the idea of head-to-head competition in cyberspace was explored . . . and dismissed. CompuServe and bulletin board systems dished up several simple, text-based multiplayer games. However, none of these games matched the bells and whistles associated with today's whiz-bang CD-ROMs such as *Myst* and *MechWarrior 2*.

In 1991, Sierra On-Line Inc. launched an ambitious graphical online service called the ImagiNation Network. In 1994, Catapult Entertainment Inc. followed with Xband, which was designed to link Sega and Nintendo system players through a special modem. Both failed. Sluggish response times over telephone lines, poor delivery systems, limited choices, and prohibitive monthly fees doomed their development. In most cases, there was more challenge getting to the games than actually playing them, says Denise Brennan, an avid gamer and Seattle-based advertising executive.

But all that's about to change thanks to the incredible growth of the Internet's World Wide Web, the growing dominance of multimedia

PCs, a trio of advanced online game services, and the first wave of truly multiplayer games.

Let The Games Begin. The new games are called "multiplayer" because you can, in addition to playing against your PC, use a regular high-speed 14.4 kilobits per second (Kbps) or 28.8Kbps modem for the ultimate gaming experience: competing against other players in real time using the Internet, an online service such as America Online (AOL) or Prodigy, or simply modem-to-modem.

"The first generation of multiplayer games provides one tremendous advantage over every single previous computer game: better competition," says Mike Slade, president/CEO of Starwave Corp., publishers of *Castle Infinity*, a kids' CD-ROM/Internet game. "Real intelligence is better than artificial."

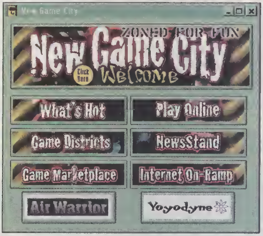
Most gaming enthusiasts echo the feeling that it's much cooler killing a friend or blowing up a human player than beating your PC.

But multiplayer online games will do more than just offer head-to-head competition. Using special Web sites, these games are expected to create online communities where members compete in spectacular multiplayer three-dimensional (3-D) battle arenas the likes of which can't even be imagined today. Armed with the latest games, these future arcade metropolises will provide a bustling online community for gamers that is rich with chat rooms, brag boards, software libraries, E-mail, and shopping centers.

More importantly, these services are expected to generate an overkill of new revenue resources (everything from new hardware and software to special pay-per-view events) and hot-wire the already cutthroat technological race to improve the Internet.

At least that's the game plan behind three startup companies—Engage Games Online, Mpath Interactive, and Total Entertainment Network (TEN)—who are among the companies launching advanced online game-playing services. Their goal is to shift the game-playing focus away from playing against a computer or sitting in front of a TV.

Battle In Cyberspace. Certainly the most ambitious of the virtual arcade networks is Engage Games Online (http://www.games-online.com, 714/553-6655). Originally a division of Interplay Productions, the developers of popular computer games, the now separate spin-off company has closed deals with both AOL and Prodigy, tapping into their combined subscriber base of 7 million users. Both AOL and Prodigy expect to have the Engage network online and operational by this fall at no extra charge to subscribers. Among initial offerings will be Interplay's *Descent*, *Castles II*, and *Mud II* along with Interworld's *Rolemaster: Magestrom* and *Splatterball*.



***New Game City* is CompuServe's version of an online gaming community. Users can play games against each other or log on to the Internet for other gaming sites.**

Engage will be paid by AOL and Prodigy for the time subscribers play games online, though the service will be available only to Windows subscribers. Players accessing Engage directly through the Internet will be charged an hourly fee, says Jeff Leibowitz, president of Engage. To offset costs, Leibowitz expects to charge computer game equipment makers and other companies who want to advertise their wares online. The fledgling company will offer as many as 15 games by the end of the year.

Like Engage, both Mpath Interactive and TEN will bring popular PC-based games from well-known publishers to the Internet. Because all three networks are in a race for exclusive content, games on one network will not appear on another.

Unique to Mpath's Mplayer service will be gamers' ability to cheer, taunt, and harass each other vocally in real time with player-to-player speech communications in both chat rooms and during game play, says Kristin Asleson, vice president of marketing. While speech on the Mpath network will be **half-duplex**—meaning gamers must take turns talking through their voice modems—industry insiders believe voice communication is a critical feature if these services hope to catapult from game enthusiast to the mass market. Mpath (http://www.mpath.com, 408/342-8800) expects to sign up 30,000 subscribers by year's end.

TEN (http://www.ten.net/, 415/778-3500) anticipates 50,000 subscribers by the end of the year and as many as 125,000 in the first year of operation. Even though software is available only for Windows 95, the company says more than 4,000 players are currently using a test version available on its Web site.

All three companies say connecting to their online services will be easy. AOL and Prodigy subscribers simply can link to the Engage Forum when it becomes available. Engage, Mpath, and TEN can be accessed directly through their respective Web sites. To play games, you either can download the software directly from the Web site or purchase it at a store. Once these CD-ROMs are installed, gamers can link directly to the respective Web sites. In effect, you're not buying the game when you log on; you're buying access to the online community of fellow gamers.

To actually play games with someone else, you can have the service automatically match you up. Also, some services will let you meet players in a special room and pick opponents. Once in the game, players can communicate with other players—either teammates or opponents—by typing messages or using voice modems. In a combat strategy or shoot-'em-up game, pilots would be able to talk to the crew, or commanders could talk to their troops as well as to enemy players.

Certainly one of the industry's gravest concerns is how these action games—sometimes referred to as "twitch" games because of the rapid hand movements needed to maneuver them—will play online. Industry insiders are concerned that the response time (or latency time) will be too great. Even a half second between the time a figure in a game is kicked or shot to the time it falls or dies is considered an eternity in game time. All three online networks promise their service will deliver the fastest latency, which is about 100 milliseconds, but agree their speeds will work better on less twitch-intensive games such as flight simulators, races, board games, and card games.

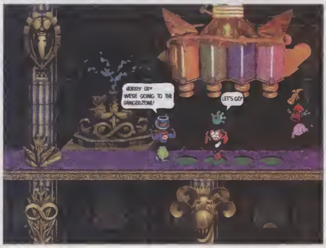
Virtual Bust? But what really concerns industry analysts is that while multiplayer gaming sounds great, one major question remains: Is it compelling enough to become a booming business?

Stuart Moulder, product unit manager of action and strategy games at Microsoft, admits the online multiplayer game market potential is huge but cautions against "a gold rush mentality."

"Will hard-core gamers, and more importantly people who traditionally do not play games, spend time and money online?" Moulder says. "Will the gaming experience be compelling enough to warrant repetitive consumer usage? Should subscribers pay a fixed price or pay on a meter?"

Most importantly, how will the industry educate consumers new to the multiplayer arena? "Right now, consumers feel everything on the Internet is free," Moulder says. "The first step will be making games playable on the Internet, with easier access, and something much better than typing a response to communicate with other players. The next step will be figuring out what and how to charge. But the long-term future depends on developing games that can only be experienced on the Internet, games with 100,000 people or more."

TEN's Daniel Goldman, chairman and editor-in-chief of the network, goes even further. "Games of the future will provide the framework for users to script their own scenarios so that the game is constantly fresh and changing," he predicts. "This is a very social medium, and we haven't begun to tap its full potential."



***Castle Infinity*, an upcoming multiplayer CD-ROM/Internet game, lets children adopt a cartoon avatar and explore the world.**

Other Games In Town. In the meantime, not every game manufacturer is hitching its electronic wagon to these online services. Many, such as Hasbro Interactive and Starwave, are going it alone, developing proprietary interactive Web sites geared exclusively for their users. Others, like Turner New Media, will shift their focus away from standalone CD-ROM-based games toward multiplayer games that can be played over the Internet.

Hasbro Interactive's *Monopoly* ($39.95, 800/874-4607, 714/833-8710) is an excellent example of a multiplayer online game. Available now, you can compete against as many as four other capitalists all over the globe via Parker Brothers' popular Web site, which tops 100,000 hits every month. The classic board game has been updated with 800 animations, high-resolution 3-D graphics, and 1930s ragtime music. Monopoly provides real-time translations in English, French, and German while funds are automatically converted from dollars to deutschemarks so global games aren't restricted by language or currency barriers. A text-based chat line lets you communicate by typing in deal-making commentary.

Hasbro Interactive plans to launch the first official Monopoly tournament over the Internet in November. Details on registration, rules, and prizes are posted on its Web site (http://www.monopoly.com).

Starwave's *Castle Infinity* is an ambitious multiplayer CD-ROM/Internet game for children that is slated for release later this year. Unlike many action adventure games, Castle Infinity stresses teamwork and cooperation rather than violence to explore this animated kid's clubhouse. It boasts top-notch animation, singing dinosaurs, and a virtual world with a planned 45-room landscape for players to explore. By adopting cartoon avatars, Castle Infinity players will be able to see themselves in a unique third-person perspective. Consistent with the online clubhouse theme, members will be able to send E-mail, download files, swap information, and more. Slade expects it will take gamers at least three months to fully explore the castle. Free downloads are available at http://starwave.com (800/457-8646, 206/ 957-2000).

Now Playing. While software developers continue to incorporate multiplaying capabilities into their games, online services such as AOL and Prodigy are also tapping into the multiplayer market. Several multiplayer, fantasy role-playing games such as *Gemstone II* are already available on both services by searching for the word gemstone.

When Prodigy recently created a simple multiplayer checkers game (Jump: checkers), subscriber hours spiked, says Bill Battle, product manager for entertainment. "It just substantiates our belief that subscribers want to compete against each other." Prodigy is currently working in-house on a backgammon game.

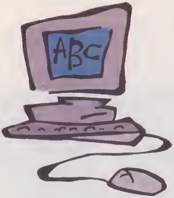
CompuServe, too, has a separate online games forum (Go: entertain, double-click Fun & Games, then double-click Online Games). Selections range from venerable shoot-'em-ups such as *MegaWars* to role-playing games like *Castle Quest* and *Worlds Away*. *New Game City* (Go: games) is a terrific gaming community where you can compete in multiplayer games such as *Air Warrior*, exchange information, get the latest news, and shop online. CompuServe's *New Game City* also will connect you to games sites on the Internet. All sites listed are free, though standard CIS connect-time charges are always in effect.

The Internet is expected to be such a hotbed of future gaming activity that a Video Game Yellowpages Web site is now in under construction (http://www.gamepen.com/yellowpages/).

But not every multiplayer venue is shoot-'em-up or role-playing related. Interactive Imaginations is touting its *Riddler* Web site as the first interactive game show on the Internet (http://riddler.com). If successful, can "Let's Make A Cyberdeal" be far away?

Even though industry analysts believe all of the kinks in these multiplayer systems won't be worked out for years, you can be sure that whatever technology is finally adopted will spill over to the rest of the computer community. You may never compete in a multiplayer game, but you're guaranteed to reap their benefits in all aspects of future computer activities from E-mail to a George Jetson vid-phone. ■

by Michael Cahlin



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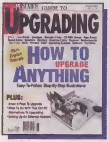

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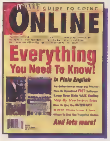

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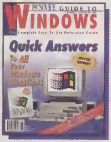

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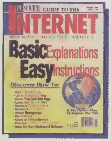
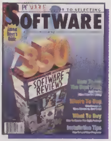


Guide To The Internet will let you see past the hype and find out what the Internet is really about. This special issue will help new users get the most from their time on the Internet. Guide To The Internet is a must-have issue for anyone thinking about exploring the 'Net.



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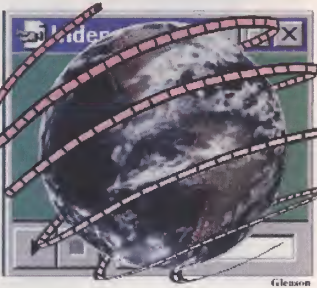
Internet Video:

Will It Muscle Into Prime Time?



Gleason

The Internet enthralls a growing number of users, but its small band of devotees pales in comparison to that controlled by entertainment big dogs like television.

TV has what the 'Net lacks. Moving pictures, stereo sound, and well-financed content come together to create the kind of multisensory experience you just don't get from watching World Wide Web pages slowly drip from your modem onto your computer monitor.

Although it is severely limited by a lack of **bandwidth**, or network capacity, Internet video does exist in a crude form. Some even liken it to the early days of television, when people crowded around small black-and-white screens built into furniture-sized TV sets. With computers and the Internet nosing into every corner of life, however, Netcasting is likely to pull itself up from these humble beginnings faster than we expect.

Get The Picture. Sending video over the Internet or any other network isn't exactly the same as sending video to televisions. TV relies on the broadcast method, in which a signal is sent to everyone whether they want it or not. Even if we have our televisions turned off, the signal from the cable company or local transmitting tower is available. The television doesn't need to request a transmission; it is already there as soon as the power is flipped on.

This model doesn't work for computer networks. If Internet users received bandwidth-dominating, full-video feeds even when they did not want them, it would greatly reduce the PC's capacity to perform other tasks such as file transfers or E-mail exchange. To avoid this problem, Internet video uses the **multicast** method, in which computers that want to receive the video must seek it out. It still can be sent to many computers at the same time, but it isn't constantly sent to everyone on the system.

Though multicasting makes one-to-many Internet video possible, it isn't quite a reality for most users. Like nothing else on the Internet, video eats bandwidth, cleans its plate, and asks for seconds. Since most users are stuck with slow modem connections, Netcasting is out of reach. Even fast 28.8 kilobits per second (Kbps) modems aren't enough to deliver the 30 frames per second (fps) video the human eye needs to be tricked into seeing fluid motion. Most Internet video is lucky to make it to 10fps even after being compressed by the transmitting host computer and decompressed by receiving client computers.

A handful of software systems performs the small miracle of transmitting shaky live video over the 'Net, but the price users pay is a degraded and usually tiny image. What you need to take a look at a few of these grainy little videos for yourself depends upon what kind of Internet connection you can access.

One of the most sophisticated network multicast technologies is The Internet Multicast Backbone, or MBone, a system of special Internet router computers in more than 20 countries. The MBone was launched in 1992 as a voluntary, experimental effort to learn more about multicasting technologies over networks such as the 'Net.

The MBone is capable of showing 320 x 200 pixel, 24-bit true color images at decent frame rates. However, it only works with connections that are more than 128Kbps. Good video performance requires 150Kbps. Only expensive workstations running advanced operating systems such as SunOS need apply, and even then it takes experienced system operators to set the whole thing up.

Desktop Video. For more average desktop users, the most advanced method of sending video over the 'Net is *CU-SeeMe*. The "CU" stands for Cornell University, where the software was originally developed for use in videoconferencing. *Enhanced CU-SeeMe*, the most recent version, is available online from White Pine Software for $69. A free black-and-white-only version can be found on the CU-SeeMe home page at http://cu-seeme.cornell.edu.

CU-SeeMe can be used over any TCP/IP network such as the Internet at speeds of 28.8Kbps or more. With a small video camera, a user can send video as well as view up to eight different feeds simultaneously. Frame rates per second hover in the single digits over a modem connection, but it still can be exciting to participate in a global conference with eight faces staring at you. Sound is generally quite understandable.

If you don't have a video camera for sending video of your own, you can still log in to many public CU-SeeMe Netcasts. An event guide at http://www-personal.umich.edu/~johnlaue/cuseeme/default.htm provides a phone book of other CU-SeeMe users as well as a handful of ongoing conferences that anyone can watch. A Yahoo! search engine or similar search for the words **cu-seeme** also brings up a number of interesting sites.

Depending upon the quality of your connection, CU-SeeMe can be a real videoconferencing tool or a quirky experiment. On a 28.8Kbps dial-up line, a live feed from a popular site can scan across the screen more like really fast still video than slow-moving video. A direct Internet connection to sites with a few lurker-viewers demonstrates identifiable movement, but overall bandwidth limitations will keep CU-SeeMe from the living room for the near future.

For the Web-wandering masses, several companies, including VXtreme, Xing Technology, and VDOnet, produce client programs that let users tap into **streaming** video. With streaming, Netizens don't need to wait for long downloads before watching a video; it appears moments after a user clicks the link. The frame rates are low and the screen sizes small, but for users with slow connections, streaming is the only way to go.

VDOnet's VDOLive player is typical of streaming video programs. VDOLive can be downloaded for free and is designed to work with Web browsers such as *Netscape Navigator* or Microsoft's *Internet Explorer*. Whenever you come across a VDOLive clip on a Web site, a single click starts the process of filling VDOLive's buffer and beginning playback.

The VDOLive gallery at VDOnet's Web site pointed us to a handful of sites around the Internet using VDO video streams. One of the things that impressed us about VDOLive was the unusually good sound quality. Picture quality on the tiny screen area varied, but sound was almost always quite easy to understand and rarely failed. Users with 28.8Kbps modems can expect around 8fps to 10fps. An ISDN connection or better can boost reception up to 15fps. (For more information on ISDN, see "Widening Your Route To The Internet" in this issue.)

VDO sites today merely offer prerecorded material that Web visitors can replay, but coming soon is the first step on the road to equalizing television and the Internet: live multicasting. CBS News announced plans earlier this summer to use VDOnet's new VDOcast technology to multicast on the Internet gavel-to-gavel coverage of both the 1996 Republican and Democratic national conventions. The GOP will meet Aug. 12-15 in San Diego, and the Democrats will gather Aug. 26-29 in Chicago. Each event will be seen in its entirety around the globe by anyone who tunes in to VDOLive.

Abigail Johnson, spokesperson for VDOnet, says the two conventions are only the beginning. The NBC and TBS networks are also looking into what VDO can do for them.

"I think that they see this as an experimental medium," she says. "They're really beginning to understand how they use it."

Johnson says the most powerful aspect of VDO for networks such as CBS and NBC is that it lets them go into considerable depth on a topic. For instance, CBS television will broadcast only the highlights of the political conventions through the airwaves. On the Internet, the proceedings will be shown live from beginning to end.

"It complements instead of duplicates," Johnson says.

■ **Coming Attractions.** In a bandwidth-rich future, Internet multicasting technology could slowly grow to not only complement but envelop. One can easily imagine the day when users might watch network news on Internet-speaking televisions with the ability to jump on command to other channels that discuss each story in greater detail.

Johnson says technology like VDOcast could evolve toward that vision, but users shouldn't start popping corn and saving the good seats just yet.

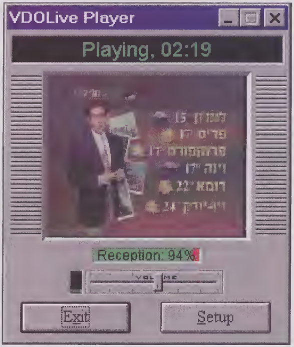
"If that were to ever happen, it would be quite a ways down the road," she says. "The Internet, as opposed to a cable system, is a totally variable network. There are pipes of different sizes all over the network, and that's not going to change soon."

But change it will eventually, meaning video communication will never be the same. Cable aficionados might be impressed with their 75 or so channels, and satellite dish owners can boast hundreds, but an Internet multicasting model would support an *unlimited* number of channels. A global broadband network would give anyone with a video camera the means to transmit whatever they wish to whomever wants to watch, an ability that Johnson says is the true calling of Internet multicasting.

"People with special interests will be able to share their interests not only in words but in video," she says.

The implications are a bit staggering as far as giving average citizens the opportunity to share news and views with one another across national borders. A core group of main channels will almost certainly survive to provide audiences with their sitcom-laden prime time because only a limited number of companies will have the funds to produce slick programming. However, the Big Boys will have to learn to do more with less as an increasingly fragmented audience divides the advertising pie again and again.

For now, we're still at the beginning of this particular drama. Standard television remains the king, but if you've got the interest and a fast modem, you might want to fire up the computer and watch the show for a bit. It's only going to get better from here. ■



VDOLive offers streaming video (albeit at low frame rates), such as this Israeli weather report, to home Internet users.

by Alan Phelps

For More Information:

Enhanced CU-SeeMe
White Pine Software
(800) 241-7463
(603) 886-9050
http://goliath.wpine.com/cu-seeme.html

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Jump: file cabinet

Upgrading a computer's capabilities involves more than adding or replacing hardware. Solid, dependable shareware can enhance the functionality of your PC at a lower price and with less effort than physically installing a hardware component, such as a diskette drive or an expansion card. Shareware also gives users the opportunity to sample a product before paying for it, or in the case of freeware, not paying for it at all! The shareware libraries listed above offer thousands of utilities, compression programs, World Wide Web browsers, word processing tools, accounting applications, games, screen savers, and much more that's bound to increase your computer's functionality.

Rate Your Risk
http://www.nashville.net/~police/risk/index.html

Evaluate your chances of becoming a victim of violent crime. Taking into consideration such factors as personal habits, demographic information, and travel statistics, this "threat assessment," as the Nashville Police Department calls it, reveals whether you have a low, moderate, or high risk of being murdered, assaulted, or burglarized. It also provides practical advice on how to reduce your risk of becoming a victim.

team NFL
http://nflhome.com

Team NFL takes you behind the line of scrimmage and into the locker rooms of the 30 National Football League teams. Like other great football sites, such as ESPNET SportZone's NFL or SportsLine USA's NFL Stadium, you can review schedules, results, rules, and records; peruse the latest news from the gridiron through the online news wires and related Web sites; and keep up with the changing world of professional football in the lively chat room. But unlike ESPNET SportZone or SportsLine USA, which solicit paid subscriptions, team NFL is free. With a price that can't be beat, team NFL is our hands-down preseason pick.

SALON
http://www.salon1999.com

Now that the kids have gone back to school, mom and dad can tweak their own education through the interactive electronic magazine (e-zine), SALON. With a variety of topics covering culture, politics, romance, and economics, SALON differs from its hard-copy competitors because it not only gives readers a chance to see an issue from the writer's perspective but also gives them the opportunity to respond in an open forum. Daily news updates, as well as book, film, and music reviews, are also regular features.

Doonesbury Town Hall
http://www.doonesbury.com

The satire of Garry Trudeau has influenced the political thought of thousands of newspaper readers for more than 25 years. Now, Doonesbury has infiltrated the Web, and cyberpolitics will never be the same. Each day brings a new assortment of news from the political world. Users can voice opinions about current issues in an unscientific straw poll or review the Doonesbury strips from past election years. Another incentive to visit the Town Hall: a percentage of each purchase from the small Doonesbury gift store is donated to one of 12 preselected charities, including the American Cancer Society, Amnesty International, and the Coalition for the Homeless.

Adoption Resources
http://www.adopting.org

Adopting a child can be a trying experience for the prospective parents as well as for the child. Adoption Resources hopes to simplify things by providing information about the adoption process. From finding a reputable adoption agency and learning about adoption regulations to parenting advice and concerns about dealing with birth parents, the friendly articles and numerous links to related sites are a great starting point for anyone considering domestic or international adoption.

NBC.COM
http://www.nbc.com
ABC
http://www.abc.com
Eye On The Net@CBS
http://www.cbs.com

To some people, September means only one thing: the new fall television lineup. Now, television connoisseurs can use the Internet to enhance their viewing pleasure. The major networks have embraced the Web, offering their audiences healthy servings of gossip, news, programming schedules, and other information to supplement their weekly fare. NBC has far outpaced the rest of the field, with extensive news coverage and home pages for each of its prime-time shows. But ABC also provides an extensive news page, and CBS has plenty to offer "Late Show" and "Late Late Show" fans. ■

Compiled by Jeff Dodd

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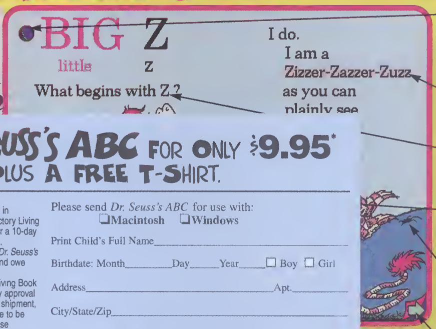

BIG Z
little z
What begins with Z?

I do.
I am a
Zizzer-Zazzer-Zuzz
as you can
plainly see

lick on Izz
d he counts
e Zs he sees.

- *Click on the ball to hear the delightful rhymes of Dr. Seuss™ read to you.*
- *Click on any word to hear it pronounced.*
- *Click here and you'll see lots of fun words that start with Z!*
- *Click on Zizzer-Zazzer-Zuzz to hear a jazzy zizzer tune.*
- *Click in this hole and a little, yellow Zed pops out to say hello.*
- *Click here to turn the page and have fun with other letters.*

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PC Novice 9/96

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City/State/Zip____________________

Telephone Number (________) ____________
Area Code

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City/State/Zip____________________

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Area Code

Print Your Full Name ☐ Mr ☐ Mrs. ☐ Ms.____________________

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PLUGGED IN

Find It ONLINE

Jumbo!
http://www.jumbo.com

Shareware.com
http://www.shareware.com

Netscape
http://www.netscape.com

America Online's Software Center
Keyword: software center

CompuServe's Shareware Services
Go: shareware services

Prodigy's File Cabinet
Jump: file cabinet

Upgrading a computer's capabilities involves more than adding or replacing hardware. Solid, dependable shareware can enhance the functionality of your PC at a lower price and with less effort than physically installing a hardware component, such as a diskette drive or an expansion card. Shareware also gives users the opportunity to sample a product before paying for it, or in the case of freeware, not paying for it at all! The shareware libraries listed above offer thousands of utilities, compression programs, World Wide Web browsers, word processing tools, accounting applications, games, screen savers, and much more that's bound to increase your computer's functionality.

Rate Your Risk
http://www.nashville.net/~police/risk/index.html

Evaluate your chances of becoming a victim of violent crime. Taking into consideration such factors as personal habits, demographic information, and travel statistics, this "threat assessment," as the Nashville Police Department calls it, reveals whether you have a low, moderate, or high risk of being murdered, assaulted, or burglarized. It also provides practical advice on how to reduce your risk of becoming a victim.

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through the interactive electronic magazine (e-zine), SALON. With a variety of topics covering culture, politics, romance, and economics, SALON differs from its hard-copy competitors because it not only gives readers a chance to see an issue from the writer's perspective but also gives them the opportunity to respond in an open forum. Daily news updates, as well as book, film, and music reviews, are also regular features.

percentage of each purchase from the small Doonesbury gift store is donated to one of 12 preselected charities, including the American Cancer Society, Amnesty International, and the Coalition for the Homeless.

Adoption Resources
http://www.adopting.org

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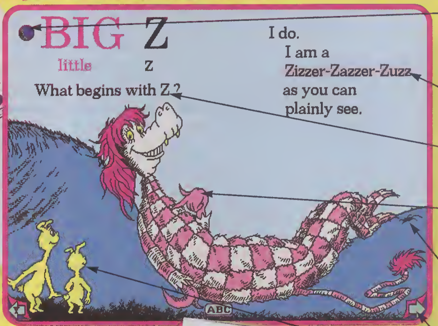

BIG Z
little z
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Zizzer-Zazzer-Zuzz
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Click on the ball to hear the delightful rhymes of Dr. Seuss™ read to you.

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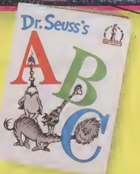

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System requirements:

Windows 3.1: 386 SX or higher processor • 4MB RAM • 256-color Super VGA (640x480) • IBM compatible sound card • Mouse • CD-ROM drive

Windows 95: 486 or higher processor • 8MB RAM • 256-color Super VGA (640x480) • IBM compatible sound card • Mouse • CD-ROM drive.

MAC: 4MB RAM • System 6.0.7 or higher • 256-color monitor • CD-ROM drive.

* Plus shipping and handling. Sales tax where applicable.

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Upgrading To Multimedia

Perhaps no one has noticed the rise in multimedia capabilities more than users who purchased computers prior to the revolution of sights and sounds. The high-powered PCs of the multimedia age seem to offer more than just improved capabilities and better performance than their predecessors. They also appear to be a lot more fun.

Fortunately, you can convert some older-model computers into movie screens and noisemakers. With PC equipment prices dropping all the time, it's relatively cheap and easy to add components that give PCs more flair.

Of course, not every user needs a multimedia upgrade, and not every computer is a viable candidate for one. As with any computer upgrade, users first must evaluate current and future computing needs. Word processing applications, personal finance packages, and databases are just a few programs that typically don't require video or audio during normal use. Games and educational software, on the other hand, are among programs that do need at least a minimum level of multimedia capabilities.

Users also must determine the cost-effectiveness of an upgrade. Remember that a computer is neither one discrete entity nor a hodgepodge of independently operating mechanisms. Rather, it's a team of interconnected components working together for a common cause. While this is necessary for running complex applications, it may cause problems during upgrades. Installing a CD-ROM drive in your computer also might require buying better software, which could mean adding more RAM, a larger hard drive, a better monitor, and a faster microprocessor.

To determine what's involved in a multimedia upgrade, compare your computer's capabilities to the chart below showing the guidelines set by the Multimedia PC (MPC) Marketing Council. This group determines the minimum capabilities of a multimedia PC.

You definitely need a computer that meets the MPC3 standards in order to use the graphics-intensive software sold today. As in all upgrade decisions, take stock of how you plan to use your computer. Text-intensive software, such as a CD-ROM library, will probably operate just fine in a computer that meets the MPC1 standards. Just be sure to check all software packages for system requirements before purchase.

■ **Who Needs It?** Most high-end 486- and Pentium-based (or compatible) computers are multimedia-ready at sale time and shouldn't require an upgrade yet. Some users of these computers, however, may decide to take advantage of low prices and immediately add a faster CD-ROM drive or a bigger hard drive. These users should check with their computers' manufacturers to find out which components are recommended for use with a particular computer brand.

Users of especially old computers, such as the IBM PC or the Commodore 64, shouldn't consider an upgrade at all. An upgrade on PCs this old would require completely replacing everything. You can't even reuse the casing of these old computers in most situations.

This leaves users of 286-, 386-, and low-end 486-based computers as prime candidates for multimedia upgrades. They should first take inventory of their computers to determine their multimedia needs. Check the user's manual and other documentation that came with the computer or remove the cover and physically examine the equipment. Write down the processor size, hard drive capacity, monitor type, and other relevant information, then compare your current system with the MPC standards you need to meet.

As you compare lists and figure the price of an upgrade, consider the relative life span of each upgrade component. Some multimedia components, such as microprocessors and CD-ROM drives, are replaced fairly regularly by newer versions with improved capabilities. Further, these components usually come

How Far Do I Need To Go?

Use this chart to determine which components on your PC need upgrading to meet various MPC standards.

Component	MPC1 (1991)	MPC2 (1993)	MPC3 (1996)
Processor	16MHz 386SX	25MHz 486SX (compatible)	75MHz Pentium (compatible)
RAM	2MB	4MB	8MB
Hard Drive	30MB	160MB	540MB
Display	VGA	VGA, 64K colors	VGA, full-motion video
CD-ROM	1X (150Kbps)	2X (300Kbps)	4X (600Kbps)
Avg.SeekTime	1 second	400milliseconds	250milliseconds
Sound Board	8-bit	16-bit	16-bit
MIDI	yes	yes	yes
Speakers	yes	yes	yes (3 watts/channel)
Operating System	Windows 3.0	Windows 3.0	Win 3.11/DOS 6.0

pre-installed on new computer systems. Unless you intend to use these components on a regular basis, consider saving the money for the purchase of a new computer system.

Other multimedia components, such as monitors, hard drives, and RAM, can be transferred to and used with future computers. Even if you don't use these components much with your current computer, you might wring some value out of them down the road.

The following list provides more components to consider when deciding to upgrade.

The processor and motherboard. Upgrading a processor is tricky business because the motherboard on which it sits greatly affects the processor's performance. The **motherboard**, the PC's main circuit board, contains the **data buses** that transfer data between components in the computer. The processor can transmit data only as fast as the data buses can move it. Upgrading a processor by one generation (i.e., 386 to 486) probably won't require a new motherboard; making a two-generation jump, on the other hand, almost surely will.

Replacing the motherboard involves taking everything out of the computer. Because of the effort and money required by this type of upgrade, most people choose to buy a new computer. Contrarily, if you've upgraded previously or already have newer versions of other components, you might have a good reason to upgrade the processor and motherboard. See the June 1996 edition of "Your Old PC" for more information.

Expansion cards. Expansion cards, often called **daughterboards**, plug into the motherboard via expansion slots and therefore are limited, like the processor, by the motherboard's capabilities. Again, it's the data buses that slow down the movement of data within the computer. The most popular buses in use right now are Industry Standard Architecture (ISA), Extended ISA (EISA), Video Electronics Standards Association Local Bus (VLB), and Peripheral Component Interconnect (PCI) bus. The PCI local bus is gaining in popularity, and as time passes, more new components will adhere to this standard. Before purchasing a sound card, video card, or some other type of expansion card, make sure your computer has the type of bus required by the card.

Drive bays, serial ports, and parallel ports. The newest computers today, particularly those with a vertical tower or mini-tower case design, offer a number of drive bays for easier upgrading in the future. Unfortunately, many older computers only offer one 3.5-inch bay and one 5.25-inch bay, or perhaps just the latter. Make sure you have an available bay before purchasing a new drive.

If you don't have an available bay, you still can upgrade. External drives, which are slightly more expensive, come in protective plastic cases and plug into parallel ports or serial ports on the back of your computer. Many computers offer only a few ports but allow for **daisychaining** (where the first component connects directly to the computer, the second component connects to the first, and so on) to accommodate multiple external components. As usual, check your computer before purchasing a product.

Finally, after you've decided to upgrade, shop around for parts. Most of the components available in computer stores are designed to work best with the latest technologies. These top-of-the-line products may be a sound investment if you plan to purchase or build a newer computer in the near future. If you have less ambitious multimedia plans, you might be better off finding upgrade components designed for an older computer. For example, a 10-speed (10X) CD-ROM drive may be the best that money can buy, but a 386 will never flaunt its true capabilities. A hard-working 2X CD-ROM drive may work just as well on the 386. Your computer will never know the difference, but your pocketbook surely will.

In short, don't give up on your dull and mute computer but realize its limitations and incapacities. Upgrading an older computer can be a waste of time and money, but with a little research and careful consideration, it could add years of future use to your old PC. ■

by Jeff Dodd

From Our Readers...

Dear PC Novice:

After reading "Your Old PC" in the May issue, I bought a used 8088 computer. It is a 16MHz machine with 640 kilobytes (KB) of RAM, a 32 megabyte (MB) hard drive, and a 5.25-inch diskette drive. The trouble is that I can't find a word processing program on a 5.25-inch diskette.

Can I replace the drive with a 3.5-inch drive? If so, can I upgrade the DOS from version 3.3 to 6.1?

Fred J. Blanck/Lansing, MI

It's possible to install a 1.44MB 3.5-inch diskette drive on an 8088, but the task may be a little tricky. A 3.5-inch diskette drive is compatible with any version of DOS 3.3 or newer. But in order to install a 3.5-inch drive, you need to find an 8-bit, high-density controller card. These cards are no longer available, and they'll be difficult to find, but try used computer stores. We found one at Sprague Magnetics (800) 553-8712 in Van Nuys, Calif. With the right parts, making the switch to a 3.5-inch drive is relatively easy.

Be careful when selecting a 3.5-inch diskette drive to install on your machine. There are possible hardware conflicts that can be detected only on a unit-by-unit basis. We recommend you shop around and call the manufacturer of your 8088 or the manufacturer of the diskette drive you'd like to purchase and tell them what you're going to do. Either one should be able to tell you whether the two are compatible.

The DOS upgrade won't be as easily resolved since DOS 6.1 will be a little beyond your machine's capabilities. Theoretically, DOS 6.0 will run on an 8088 with 640KB of RAM, but it will run slowly, and there won't be any memory left over to run any applications. This means you can run DOS, but that's about it. Microsoft recommends a 386 processor to maximize the full potential of DOS 6.0.

Be careful that you aren't trying to push your 8088 beyond its capabilities.

Send questions about old computers to:
Your Old PC
c/o PC Novice
P.O. Box 85380
Lincoln, NE 68501 (Volume prohibits individual replies.)

On And Off With Ease

All computer users need some tricks up their sleeves to make the most of their PC time. This month, we offer tips on how to make your log on/off time even quicker in four areas: hardware, operating systems, networks, and online.

Turning On The Old Hardware. How can you make switching on the power to your computer fast yet safe? We recommend plugging all of your hardware into a **surge protector** or **UPS** device (uninterruptible power supply), then switching on the main power from there. Both of these devices protect your costly hardware from electrical spikes and power failures and can provide enough battery power to give you time to safely shut down all of your applications when the power goes out. Several companies manufacture quality products, including American Power Conversion (APC) and Curtis by Rolodex. (Surge protectors are not the same as **power strips**, which only let you connect five or six components into one socket.)

How often should you turn your PC on and off? That's a difficult question to answer. On one hand, switching on the power button causes electricity to surge through your system, making it advisable to turn your computer on and off as little as possible. On the other hand, whenever you turn on your PC, it goes through a **power-on self test (POST)**, which is a valuable diagnostic tool that lets you know your computer's parts are working properly. So keeping your PC turned on permanently isn't the answer, either. With all of this in mind, most experts agree on a middle ground; shut down your system if you aren't going to be using it again within three hours or so.

Turning It Off. So now that you can turn on your hardware efficiently, how do you turn it off in the same manner? It's easy once you have everything connected through a surge protector. With a single switch, you can cut off the power to all of your hardware after your PC gives you the go-ahead or when you're at the C> prompt in DOS.

But shutting down your PC can be a lengthy process when you have several applications running at once because your operating system has to shut down each program individually. To speed this up, save all your files manually and close out of any applications that are running before you begin shut down.

The CTRL-ALT-DEL key combination, once just a quick way to reboot when users ran into problems they couldn't easily fix, has matured into a valuable tool for a variety of tasks, depending on which version of Windows you are using. This handy key combination can help you quickly complete shut downs of applications and operating systems.

When you press CTRL-ALT-DEL in Windows 3.1 and Windows for Workgroups 3.11 (WFW), one of two things will happen: Windows will tell you that you have an application that is not responding and prompt you to shut it down by pressing ENTER, or it will tell you all is OK and that you need to press any key to return to Windows or press CTRL-ALT-DEL again to restart your PC. This makes quitting an application very simple when it gets stuck.

In Windows NT, CTRL-ALT-DEL becomes your security guard, bringing you a variety of options. A box called Windows NT Security appears and displays a log-on summary with the user name and the time that user logged on. From there, you can choose to Lock Workstation (which cannot be unlocked unless you enter the correct password), Logoff, Shutdown, Change Password, or use the Task List. The Task List lets you choose to quit or switch to an application and lets you arrange the open applications in a cascade (the waterfall effect) or by tiling (in small individual boxes). Logging off or shutting down from this box is fast and easy.

Using CTRL-ALT-DEL in Windows 95 is similar to using it in Windows 3.1. Pressing this key combination gets you to a Close Program box that lets you close out an application that isn't responding by choosing End Task or Shut Down.

Logging On Simplified. Logging on to your operating system is simplified if you don't have to go through several log-on dialog boxes. If you use Win95 on a standalone system, there's an easy way to bypass the log-on box. First, open the Control Panel from Settings in the Start Menu, then double left-click Passwords. Choose the tab labeled User Profiles and check the long-winded box that says All Users Of This PC Use The Same Preferences And Desktop Settings. As a final step, choose the Change Passwords tab, then left-click Change Windows Password. After typing your old password, leave the other boxes blank. Left-click OK, Close, then reboot your PC to ensure the changes take effect.

While Win95 starts up by itself, you manually have to tell DOS to run Windows 3.1. You can make starting up this system even easier if you add a command line to your Autoexec.bat file. At the C> prompt, type **edit autoexec.bat**. At the end of the file, type **win** and be sure to save the file. Now when you start up your PC, Windows 3.1 will run automatically.

Do you have a few programs you use over and over again? If you want them to start each time you log onto Windows 3.1 or WFW, drag the icons onto the StartUp icon in the Program Manager. In Win95, drag the icons into the Programs folder in the Start menu folder of My Computer.

You also can create a variety of shortcuts that let you quickly start these applications without searching for them. To create a Shortcut Key in versions of Windows other than Win95, highlight the program for which you want a shortcut by clicking it once. Then choose Properties from the File menu in the Program Manager. Assign a key combination for the program by clicking once in the Shortcut Key box and then pressing a key on your keyboard. Click OK. That key is now a "hotkey" that will launch a specific program when used with CTRL and ALT.

Creating a shortcut in Win95 is even easier. Simply right-click any empty area of the Desktop. In the menu that appears, choose New, then Shortcut. A tutorial will help you find the right file and complete the process. A new Shortcut icon appears on the Desktop; double left-clicking the icon will launch that application.

If you want the shortcut to appear in the Start menu instead of directly on the Desktop, left-click the Start button, choose Settings, then Taskbar. Select the Start Menu Programs tab and left-click the Add button. Again, the Create Shortcut box appears on-screen to guide you through the process. Double left-click a file, then hit Next. Select a folder for the shortcut to occupy, type a name for the shortcut, and press Finish. Finally, left-click OK. The new shortcut appears when you open the Start menu on the Taskbar.

Networking. Working with networks at home or the office can result in frustrating log-on time. If you work with a local-area network (LAN) in Win95, you probably have to go through two dialog boxes whenever you log on, one each for the network and the system. To simplify this, go into the Network icon in the Control Panel and change the Primary Network Logon to the Windows Logon, then left-click OK. Don't restart your computer when asked to do so. Open the Password icon in the Control Panel and choose Change Password. Type in your old password and leave the remaining fields blank. That should take care of the pesky two-step process.

The best tip we can give you to speed up your logging-on time is to get a fast modem—preferably a 28.8 kilobits per second model.

Electronic Log-on. We all want to be able to use our online services to their fullest advantage without spending a fortune, right? The best tip we can give you to speed up your logging-on time is to get a fast modem. We recommend a 28.8 kilobits per second (Kbps) model. (Such a modem transfers data at a rate of 28,800 bits per second.) Also, try using your online service during off hours, such as late at night or early in the morning, when others are not as likely to be using it. You won't wait as long for connections, saving you even more money.

Another great idea: Compose your E-mail messages offline, connect to send them, download any new messages you might have, and then sign off. Directions for doing this are included in the manuals for America Online, CompuServe, and Prodigy. You probably can do this with your E-mail software as well.

To make logging on to your online service even easier, you can leave your password in the screen log-on box. But, for security reasons, we don't recommend doing this unless you are the only user of the PC.

One additional note: To save time and money when using the World Wide Web, try using one of the new software products designed to grab whole Web sites, links included. Then you can download them to your hard drive and browse them at your leisure (and at no expense to your online account). A good one to try is *WebWhacker* 1.0 from ForeFront Group Inc.

Our fast-paced society demands that we use our time as efficiently as possible. Whether working with online services or just trying to speed up our operating systems, simplifying the log-on process is an easy way to save time. ■

by Lissa Wiebers

For More Information:

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(401) 789-0204

Curtis by Rolodex
(800) 955-9514
(201) 422-0240

WebWhacker 1.0
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(800) 867-1101
(713) 961-1101

Q&A

Need help with your hardware or software?

Looking for simple explanations on technical subjects?

Send us your questions!

DOS COMPUTING

Q: *I followed the directions regarding making a bootable diskette. It didn't work for my Windows NT. I kept getting a message saying "NTDECT V1.0 checking Hardware," and then the system would hang.*

A: First of all, *never* assume any directions given for DOS, Windows 3.1, or even Windows 95 will work with Windows NT. (NT isn't an ideal operating system for novices, and we rarely comment on it.) There are similarities: The look and feel of Windows NT 3.51 and older is much like Windows 3.1, and the new NT version 4.0 now has a look and feel very similar to Win95. But under the skin, NT's a different beast. You tripped over the fact that there's no DOS "underneath," or loading ahead of, Windows NT, so the directions for making a DOS bootable diskette are meaningless for NT.

To make an NT bootable diskette, try this:

1. Format a diskette using NT's File Manager.
2. Copy the files Ntdr, Boot.ini, and Ntdetect.com to the diskette, first making sure you've removed the "hidden" and "system" attributes from these files. If your Boot.ini has any SCSI terminology in it (such as reference to Ntbootdd.sys), you'd also need to copy that Ntbootdd.sys file to the diskette.

If you were running NT's optional high-performance file system (NTFS) and booted your computer with a regular bootable DOS diskette (made with, say, DOS 6.2), the diskette wouldn't even be able to "see" your hard drive files. To make a bootable diskette for NTFS: (*NOTE: WINNT35 is in the \WINDOWS directory.*)

1. Diskcopy the first setup diskette. By using this command, you'll make an exact copy of the diskette, including transferring hidden files that would otherwise be hard to duplicate.
2. Delete all of the files on this bootable diskette. This may seem like a crazy thing to do since we just had you copy the files, but you'll need to do this so you can use this as a bootable diskette. The files you need will be marked as "system," "read-only," or "hidden" and won't be deleted when you get rid of the others.
3. Copy Ntdetect.com from your root directory to the diskette.
4. Copy Ntldr from the root directory to the diskette, renaming it Setupldr.bin.
5. Copy Ntbootdd.sys from the root directory to the diskette.
6. Create a Boot.ini file with these lines (spacing is important):

```
[boot loader]
timeout=10
default=scsi(0)disk(0)rdisk(0)partition(1)\WINNT35
[operating systems]
scsi(0)disk(0)rdisk(0)partition(1)\WINNT35="Windows
        NT Server Version 3.5"
```

WINDOWS 95

Q: *Can the location of the FONTS folder be moved from the C: drive? If so, how?*

A: The FONTS folder must be on the same drive and partition (drive letter) that Win95 is installed on. But you can keep your actual .TTF font files anywhere. You can move the .TTF files by dragging them with the mouse while you're in Explorer.

Q: *How do I uninstall the DriveSpace disk compression utility. I installed it from the Win95 diskettes, but I don't remember how I did it or how to remove it. Can you help me?*

A: First, you'd have to decompress your hard drive using DriveSpace's own facilities. Left-click Start, then Programs. Start DriveSpace and follow its help screens regarding how to decompress a hard drive. Before you do that, however, remember this: If, since installing DriveSpace, you've filled your hard drive with more programs and files than will fit on it decompressed, you'll have to first delete some folders to bring it back down to a capacity that will fit when DriveSpace is removed. Decompressing the hard drive can take about as long as it took to compress it.

After you've decompressed the hard drive, you'll want to remove all files and folders with names such as "Drvspace" and "DriveSpace" from your hard drive. To do that, open Control Panel, then Add/Remove Programs. Scroll down the list, highlight DriveSpace, and left-click Remove. That should do it.

WINDOWS 95 (cont.)

Q: *Are uninstaller programs still needed in Win95? Doesn't Win95 have its own uninstall utility?*

A: Indeed it does, but it's not about to put the uninstaller utility makers out of business. For one, the Win95 uninstaller doesn't remove older Windows 3.1 programs, which many of us will still be using under Win95 for years.

Also, even with true Win95 software, it isn't a very good uninstaller. Its ability to uninstall appears to depend upon the vendors of each piece of Win95 software providing good uninstallation instructions for their software at the time it's installed. But it's never been a high priority of most vendors to help you cleanly remove their programs from your system, and they've been dragged kicking and screaming to do so by pressure from Microsoft. So we'd bet that individual software vendors don't dedicate massive engineering efforts to creating a complete, safe uninstallation procedure for their software. We'd also bet that anytime a vendor-designed, self-uninstall procedure discovers the possibility that some file or folder it installed might now be needed by another program, it doesn't even check whether that's really true. Instead, it most likely errs on the side of caution and leaves its trash behind.

UTILITIES

Q: *Can I low-level format an IDE drive? I've had so many problems with mine that it seems like it might be worth "starting clean."*

A: Yes, but . . . low-level formatting is a term we don't hear much about these days because it's rarely needed. And if you do it, it may invalidate your hard drive's warranty. You see, when a hard drive starts life, it doesn't have any magnetic information on it—similar to a blank sheet of paper with no lines. Imagine people so dumb that when you ask them to write on a sheet of unlined paper, they can't do it without the lines to help them. Well, that's how dumb a computer is. Therefore, companies make special software that puts magnetic lines/markers on the disk to let your PC use the hard drive. This procedure is called **low-level formatting**. Before about 1985, this formatting was done at the time a hard drive was installed in a computer and sometimes again a few years later to fix problems. Today, it's done at the factory and normally never again.

You'd need special software to do a low-level format, perhaps from your drive maker. Of course, regular formatting (the kind done with the DOS FORMAT command) is still occasionally needed if your disk's filing system (file allocation tables [FAT]) gets messed up or if your software collection has gotten so convoluted and nonfunctional that you need to "burn down the house" to clean it. So perhaps you just need a regular formatting.

If you think you have serious problems with the basic surface characteristics of your disk, a safer and easier repair attempt would be to run *SpinRite* (800/736-0637, 714/348-7100) or *Calibrate* (part of *Norton Utilities*, 800/441-7234, 541/334-6054). These are intensive disk-repair utilities that often can fix anything short of a true hardware breakdown. SpinRite even does low-level formatting on the parts of the disk it thinks need it. Now, there's nothing to say, even if you did run Calibrate or SpinRite, that you couldn't then do a regular formatting of your disk if you wanted to re-install DOS, Windows, and all your software from scratch. (For more information on FORMAT, see "Cleaning Disks With FORMAT" in the April 1996 issue of *PC Novice*.) Formatting is easy, but a total re-installation is time-consuming and, occasionally, nightmarish.

Q: *I use a Zip drive to back up my 850MB hard drive by using File Manager's tag/copy abilities. But with each Zip platter holding only 100MB, I have to use eight Zip platters to back up my whole system, and it's pretty tedious trying to figure out which directories to copy to which Zip diskette. I wanted to buy a good Windows backup program and hoped that by its compression, at least I'd reduce that down to maybe four Zip diskettes. Then a salesperson said there are no backup utilities that work with Zip drives. This confuses me because I am reasonably sure most backup programs let you back up to any DOS device (that is, any drive that has a legal letter, such as my Zip's E:), and this would surely work on a Zip drive. Was I wrong?*

A: Partly. They'll back up to Zip drives, but we don't know of any backup program on the PC that will do with a Zip drive what it'll do with tape or even diskettes. That is, if you use a backup utility to back up your 850MB drive to, say, three 340MB *tapes*, as you reached the first tape's end, the software would say "Insert another tape" and then continue. This is called "spanning" tapes. If you try to back up 850MB onto a Zip drive instead of spanning across the Zip diskettes, the backup program fills one Zip diskette, then aborts. This is one reason for our position that Zip drives aren't ideal backup devices. NovaStor's new product *NovaDisk* (800/668-2786, 805/579-6700), the first product designed to do exactly what you want (with Zip drives and other removable disk devices), may be available by the time this publishes.

In the meantime, here's something you can do using DOS' XCOPY command instead:

1. Run the command **attrib -a** *.*/s from a DOS prompt in the root directory (C>). This "tells" each of your hard drive's files that it "has not been backed up."

UTILITIES (cont.)

2. Then run the command **xcopy c:*.* e:\\ /s/m/e/v**. That says, "Copy to E: all of the files and directories that haven't been backed up and then mark each as having been backed up."
3. When the first Zip diskette fills, you'll get an "Insufficient Disk Space" message. Just put an empty, formatted diskette in the drive, press F3 (which might automatically retype your XCOPY command for you), and press ENTER.
4. XCOPY picks up where it left off. Of course, you won't get any compression or error correction and it won't run as fast a real backup utility, but at least you'll know that you have a set of Zip diskettes containing a total, organized copy of your hard drive.

One nice feature of this trick is that it will even work with Win95 without losing Win95's long file names (provided you use XCOPY in Win95's own \COMMAND directory and *not* the XCOPY from some older version of DOS).

Q: *I've read that Win95 doesn't load a mouse driver for DOS applications. If that's true, how would I run DOS software that needs a mouse driver?*

A: That is a bit misleading. While it *is* true that Win95 doesn't automatically load a mouse driver for DOS programs when you install it, neither did Windows 3.1 or even DOS. Win95's install sometimes does disable a preexisting mouse driver by putting "REM" in front of your mouse driver line. It does that because DOS applications running in an MS-DOS window under Win95 don't need a traditional DOS TSR mouse driver because Win95 takes over the job. Leaving the mouse driver just wastes RAM. The only problem is that if you try to completely exit Windows (or interrupt the startup and go directly to DOS), you don't have a mouse driver. If after installing Win95, you find "REM" by the "Windows Setup C:\Mouse\Mouse.Com / C2" line in your Autoexec.bat file and your mouse no longer works, you could delete the "REM" to reactivate your old driver.

Mouse drivers are usually installed either by a user (normally by an automatic routine on a diskette that came with their mouse) or by hand. For a by-hand mouse driver install, it's the same as always; you just find out where on your system there is an appropriate mouse driver file. Often (but not always), the standard Microsoft mouse driver that comes with Windows (Mouse.drv) works with many mice; it's in the WINDOWS\SYSTEM directory. If this is the case, put a line such as **devicehigh=c:\windows\system\mouse.drv** in your Config.sys file.

Remember: Changes made in Config.sys or Autoexec.bat files don't go into effect until you restart (reboot) your computer.

COMPUTER HARDWARE

Q: *I'm concerned about a data bottleneck on a portable computer I want to buy. This unit comes with a 32-bit PCI video accelerator with 2MB of RAM, but I think I remember reading that with a 100MHz processor, anything less than 64 bits would restrict the flow of data. I'm considering buying the portable computer with 24MB of RAM. Would I be foolish to load up on 24MB of RAM, 1.35GB of hard drive space, pay close to $5,000, and still have the 32-bit technology?*

A: Your concern about the video is justified. There's a marked difference between running a 32-bit video card and a 64-bit one, especially in a Pentium machine. You see, the faster your CPU and motherboard, the more of a bottleneck your video card becomes. (*NOTE: 64-bit video cards need at least 2MB of RAM on them to work in 64-bit mode. Otherwise, they perform no faster than 32-bit cards.*)

As for regular RAM, unless you're planning on incredibly RAM-intensive uses (such as simultaneously running several RAM-hogging programs), it's hard to justify more than 16MB. Though most tests show increased performance from more RAM, they usually show marginal gains beyond 12MB (except on Macintoshes, which are notoriously RAM-hungry). We don't take seriously the "tests" showing that everyone needs 24MB to 64MB of RAM when those tests are run by companies in the business of selling RAM upgrades. Put that extra RAM budget into something of immediate benefit, such as a tape backup drive and six tapes. Or better yet, in a quality monitor. You always can add more RAM later, but you can't come back next year and "upgrade" your monitor from 15 inches to 17 inches or from adequate to excellent.

ONLINE COMMUNICATIONS

Q: *Word Pro and Lotus SmartSuite supposedly have several functions that connect right to the Internet as long as you have a Web browser set up for an Internet connection. Like many people, my Internet connection is via CompuServe's own Netlauncher/Dialer and Mosaic. I also know that CIS' 'Net connections/dialer are apparently not quite up to industry standard. My question is: Do Word Pro's Internet features work with CompuServe's standard Internet connection facilities? If so, do they work smoothly and simply without needing a software engineer to tweak and configure things?*

A: Maybe. If you're running the 16-bit version of Word Pro under Windows 3.1, you should be able

ONLINE COMMUNICATIONS (cont.)

to make the connection without a great deal of fuss. But if you've migrated to Win95 and are running the 32-bit (special Win95) version, you'll have a problem. The CIS dialer insists upon using its own proprietary 16-bit winsock to connect, so it has problems connecting with 32-bit applications.

This can be overcome by using Win95's Internet dialer to make a connection to CIS, but the process isn't straightforward. There's hope on the horizon, though. There are inklings that CIS will soon give up its proprietary ways. The next generation of *WinCim* will use the standard winsock and allow other software to connect via its dialer. And CIS' recent deal with Microsoft to supply and support Microsoft's Win95 *Internet Explorer* software could change this whole story for the better.

WORD PROCESSING

Q: *I have copied a file to diskette that was written using Windows 3.1 and Works for Windows 3.0. A friend who has Windows 3.1 but not Works for Windows seems to be unable to read from the diskette. We both have high-density diskette drives. Is there a solution to this problem?*

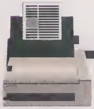
A: This has nothing to do with whether you're both running Windows 3.1, Windows for Workgroups 3.11, Win95, or DOS. It's a common beginner's problem to try to send a word processing file on a diskette to friends and wonder why they can't use it. This simple task can be a real pain in the byte! There are several barriers your document has to cross (even before we talk about going from PC to Macintosh) before your friends can use it.

The first is that the diskette drives must be able to read each other's diskettes. Yours are capable of reading high-density diskettes, so there's no problem there. (Occasionally, even when two users have the same type of diskette drives, one is subtly defective—say, running too fast or too slow—and the exchange will inexplicably fail.)

But it seems you've run into the most common misunderstanding. Every word processor stores files in its own favorite way, which usually can't directly be read by any other word processing program. The most common solution is for you to look in your word processor's help for an explanation of how to "export" a file to a different word processor's format and hope that your friends' word processors are on the export list.

If that fails, you could call up your friends and ask them to find out if their word processors can import files that are in the Works for Windows format. If you don't have any luck there, see if you can find some "intermediate format" that you can export to and they can import from. For example, most word processors can import from and export to the once-very-popular *WordPerfect* 5.1 format. As a last resort, all can export and import to a simple all-text form called ASCII (which stands for American Standard Code for Information Interchange). The downside to ASCII is that you lose all your fonts, italics, bold, and much of your layout.

Lastly, you can get special utility programs that can take a bunch of files and convert them all from one word processor format to another en masse.



PRINTERS

Q: *My new HP-5 printer has some options in its Windows Printer Setup screens under Print Quality. If I select Manual Settings, there are some puzzling choices. Under the Graphics Mode, there's a choice of HP-GL/2, Auto, or Raster. A technician at Hewlett-Packard's phone support had me set it to HP-GL/2, saying it would print faster that way. One question he didn't answer was, "What's the downside to setting it to HP-GL/2?"*

A: These options exist in most newer HP printers. The Raster setting sends images to the printer dot-by-dot, and it works fine but can be a bit slow. On the other hand, HP-GL/2 is a printer language that was originally designed for architects' plotters used to make elaborate line-drawings. So GL/2 is particularly fast in "telling" a printer about lines and curves in an image. For ordinary work, GL/2 is more efficient and requires less printer memory. Auto, of course, claims to be able to decide which mode is best at any given moment. Apparently, HP's technicians don't have confidence that Auto will always choose the fastest mode.

You're right that there is a downside to locking your printer in HP-GL/2 mode. If you have a page with large bit-mapped (.BMP) graphics (which are stored as dots rather than lines) on it, HP-GL/2 has to treat each dot as a tiny line, sending a relatively big "plot" command for each dot and making the print operation excessively large. This can overfill the printer's memory and cause general protection faults (GPFs). Raster mode, on the other hand, prints such pages more efficiently.

The bottom line? If you're happy with your printer speed and don't have any printer-out-of-memory messages or excessive slowness, leave it on Auto. If it's printing slowly, try HP-GL/2 but turn it back off if it causes other problems. ■

Get straight answers to your technical questions. Ask *PC Novice*! Send your questions, along with a phone and/or fax number so we can call you if necessary, to: *PC Novice* Q&A, P.O. Box 85380, Lincoln, NE 68501. Please include all version numbers for all software about which you're inquiring, operating system information, and any relevant information about your system. (Volume prohibits individual replies.)

ACTION EDITOR

When Ralph Nader can't be reached, bring your computer service problems to our Action Editor column. This page will help you find products, resolve service problems, and keep manufacturers alert to the critical issue of customer relations.

Are you having trouble finding a product or getting adequate service from a manufacturer? If so, we want to help solve your problem. Send us a description of the product you're seeking or the problem you've had with customer service. In billing disputes, include relevant information (such as account numbers or screen name for online services) and photocopies of checks. Include your phone number in case we need to contact you. Letters may be edited for length and clarity; volume prohibits individual reply. Write to:

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or
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Dear Action Editor:

Where can I find historically correct information on the American Revolution, including writings by the Founding Fathers, Federalist/Anti-Federalist Papers, Declaration of Independence, Bill of Rights, and perhaps including notes by American Revolutionary War scholars on intent, battles, and participants on CD-ROM?

Again, I must emphasize that the information I seek must be historically correct, as opposed to (as everyone should be) "politically correct."

Roland Berrios
La Puente, CA

Titles in Primary Source Media's (800/444-0799) excellent *The American Journey: History in Your Hands* series include The African-American Experience, The Civil War, The Hispanic-American Experience, Westward Expansion, Women in America, and, of most interest to Roland, the American Revolution. The CD-ROMs cost $149 each, but to serious researchers, history buffs, or educators, they're well worth the price. The discs' collections of documents, photos, songs, and study guides provide an excellent picture of the historical events.

For the text of historic documents, try World Library's *Library of the Future* (800/443-0238, 714/756-9500). The just-released fourth edition of this disc, $59.95, contains about 5,000 documents in their entirety, ranging from almost every memorable piece of literature to sources such as the Federalist Papers, the Declaration of Independence, the Articles of Confederation, the Articles of Capitulation at Yorktown, and the U.S. Constitution.

A seemingly endless array of online resources offers documents, photos, analysis, and opportunities for discussion with other students of history. The University of Kansas offers an exhaustive guide to the World Wide Web's history sites at http://history.cc.ukans.edu/history/index.html with plenty of data on the Revolutionary War and other military history. Also check The American Revolution and Struggle for Independence site's collection of documents at http://grid.let.rug.nl/~welling/usa/othertexts.html. Its offerings include Captain Prescott's Account of the Boston Massacre and Jefferson's draft of the Declaration of Independence. You should find plenty of Revolution discourse in the soc.history.war.us-revolution and soc.history.moderated newsgroups.

Dear Action Editor: (copy of letter sent to SoftKey International)

I purchased your PFS Resume Pro Multimedia Version back in March 1996. There was an offer for Keyfonts if I sent $2.95, proof of purchase, and cash register receipt. I sent all of that to the address that you instructed.

I sit here today with my canceled check and nothing to show for it. They deposit the check, they keep the money, and I get nothing for my time, effort, and money.

Thomas A. Murano
Pittsburgh, PA

We contacted a SoftKey representative who explained that the Keyfonts promotion was conducted with a promotions company. The representative said he'd already asked the promotions company to send a copy of Keyfonts to Thomas. But since the package apparently hadn't arrived, the representative said he would personally mail another copy to Thomas. Thomas confirmed that the software arrived about four days after we spoke with SoftKey. ■

• • • • • • • • •

Action Editor recently traveled to an industry trade show, PC Expo in New York City, to check on customer service and support efforts. Those of you who spent the last three evenings on hold for tech support may not believe it, but the news from New York was good.

Several manufacturers we spoke with said that as it gets harder for consumers to differentiate among computer brands by looking at increasingly similar features, buyers are giving more weight to a company's customer service. This is especially important to manufacturers as they sell more PCs to people buying their second or third machine. Manufacturers know old memories of poor service die hard, and they want to ensure buyers don't pass over their company because of a bad experience.

We found that several companies are hiring more service representatives and training them to handle calls better. Improved computer systems help reps see background information from customers' previous calls, hopefully sparing callers from repeating technical information. Since about 70% of customers' problems result from known problems with known solutions, companies are trying to improve self-service tech support through electronic documents and faxback services.

Action Editor saw some new products that should improve computing by keeping software updates organized and letting technicians fix PC problems via modem. Watch for a full article on the latest in tech support in an upcoming issue. ☐

September 1995

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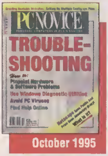
Review past articles of *PC Novice* on the following page and order today!



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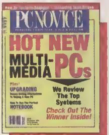

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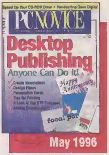

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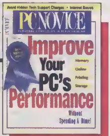

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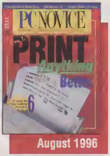

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GLOSSARY

Of Terms

CD-E—CD-Erasable. Also known as CD-Rewriteable, this compact-disc technology lets users write (or store) their own information on discs. CD-E material can be written to, erased, and rewritten to thousands of times, as opposed to CD-R media, which only can be written to once. CD-E drives can play and write to CD-E and CD-R discs and also can retrieve information off CD-ROMs.

CD-R—CD-Recordable. A compact-disc technology that lets users write (or store) their own information on discs using a CD-R drive and disc. The disc material only can be written to once, although you can come back and store information in numerous sessions. CD-R drives can play ordinary CD-ROMs and CD-R discs, and CD-R discs even can be played in CD-ROM drives.

Channel—Just like highways, phone lines can be made up of more than one lane, or channel. The more channels a phone line has, the more data that can be sent.

Device Driver—Software designed to control a particular hardware device, such as a monitor or printer. These drivers act as go-betweens for programs and devices, ensuring the devices understand the software's commands.

Daisy Chain—A set of hardware components connected in a series, where the first component connects directly to the computer, the second component connects to the first, and so on.

Data Bus—The electronic transmission channels used by computers to transmit data to and from different system components.

Daughtercard—A printed circuit board that attaches to another board, usually the motherboard, contributing additional capabilities to a computer. This is also known as an expansion card.

DVD—Digital Video Disc. A new type of storage technology for high-density discs that can hold from 4.7 gigabytes (GB) to 17GB of information. A DVD disc can, for example, store a full-length film.

Executable File—Also called a program file, this file type makes a program run and contains information that tells a program what to do. It is identified by the .EXE file name extension.

Hidden—A DOS file attribute that makes a file "invisible" to the DOS DIR, COPY, and DELETE commands. Some important system files that are required to run a PC are hidden so that users can't make changes to the files.

Hyperlink—The glue that holds the World Wide Web together. Hyperlinks provide connections to everything from other pages at your Web site to pages created on the other side of the planet.

HTML—Hypertext Markup Language. The standard language used for creating and formatting World Wide Web pages. HTML documents are essentially text documents (as you would create in a word processing program) that have tags embedded in them. These tags contain coding for text formatting, graphics, and hypertext links.

Internet Telephony—Voice communication through the Internet via a sound card, microphone, headphones or speakers, and appropriate software. Internet telephony is similar to a telephone call, but both users must have the same software and setup.

ISDN—Integrated Services Digital Network. A type of online connection that speeds up data transmission by handling information in a digital form. Traditional modem communications translate a computer's digital data into an analog form before sending it across phone lines. The data then is translated back into digital form on the receiving end.

Kbps—Kilobits Per Second. A unit of measurement for modems that measures the speed at which data is transferred over phone lines. One kilobit is equal to 1,000 bits.

GB—Gigabyte. A unit of computer storage equaling approximately one billion bytes.

MB—Megabyte. A unit of computer storage equaling about one million bytes.

Parallel Port—A port that accepts cables having parallel wires to let data flow through the cable at a high speed. Parallel ports can transfer eight bits (one byte) of data at a time. Most printers use parallel ports, which are commonly referred to as LPT1 or LPT2.

Ports—Plug-like connectors on the back of a PC's case that let the machine communicate with peripheral devices such as mice and printers.

POST—Power-on Self Test. A diagnostic tool used by DOS that checks to make sure all of the ports and peripherals on your system are working correctly. The POST happens each time your PC is turned on.

Read-only—A file attribute that means the file can be read but not deleted or changed.

Serial Port—A port that transmits data one bit at a time. These ports are used for peripherals such as mice and other input devices.

Uploading—The opposite of downloading. Instead of moving pictures or programs *from* a Web site or online service to your computer, you move pictures or programs from your computer *to* a Web site or online service.

Upper Memory—This is the area of a computer's memory between 640 kilobytes (KB) and 1,024KB (1MB) that has been remapped into usable RAM. In order to free up conventional memory, several programs, such as DOS, are transferred into the upper memory area.

UPS—Uninterruptible Power Supply. An electronic device that provides enough battery power to let you safely shut down all applications if a power failure were to occur.

The Paperless Chase

Electronic Publishing, Despite Its Strengths, Can't Kill Ink And Paper

We've heard for years that the printed word is just too old-fashioned to stand up to electronic publishing. And let's face it; our reading material hasn't made any quantum leaps since Gutenberg. Despite color and photos, it's still just words on a page. So when computers first demonstrated how much information could be stored and instantly accessed, it immediately seemed inevitable that the world's knowledge would be disseminated digitally. Today, the Internet and high-capacity storage media such as CD-ROMs have only added to rumors of print's impending obsolescence.

But a close look reveals that even today, print has its foot in the door as solidly as a salesman. In 1992, Paul Saffo, a research fellow at the Institute for the Future in Menlo Park, Calif., offered a still-accurate summation of publishing's uncertain position when he said we're living in a "moment between two revolutions—one of print, not quite spent, and another of electronics, not quite under way." Indeed, a discussion of modern publishing is a case study in a traditional medium refusing to be pushed out by new technology.

Plenty of evidence says we're about to close the book on print. Internet access and CD-ROM drives appear on their way to becoming as common as telephones and VCRs. Electronic publications offer readers powerful search capabilities and the chance to choose more directly what goes into their reading diet. Background information and multimedia clips can enhance electronic documents.

Among publishers, rising paper and distribution costs force as much cost juggling as any NFL salary cap. Perhaps that's why publishers are so interested in electronic publishing. A recent poll of publishing organizations by the Rose Market Research Group found that about 70% of them are distributing electronic publications, with 88% of them doing so on the World Wide Web and 40% on CD-ROM. Among organizations that don't currently publish electronically, 87% are interested in doing so.

But how interested are readers in their doing so? Even those who would seem most open to electronic publications are ambivalent. According to the Rose study, just 53% of readers of "multimedia/online" publications are interested in an electronic format. Thirty-nine percent of "computing" readers are interested in cyberreaders.

This indicates that most reading in the near future will still involve ink on paper. How many times would you go online, search available articles, and download ones you want before deciding to leave article choice and its attending work to editors at traditional publications? That search time comes out of the minutes you once used for sipping coffee and perusing the paper. Also, remember that as your own editor, you'll read articles on a computer screen or printout, not a highly portable, glossy page.

There are edited, ready-to-read magazines online and on CD-ROM. But they tend to be MTV-style efforts aimed at Generation Xers and PC junkies. One CD-ROM magazine we saw was more user-selected video clips than anything resembling traditional print efforts. Even more staid 'zines such as Microsoft's *Slate* address well-informed, techno-savvy audiences—not quite the formula that created superpowers such as *Life* and *Reader's Digest*.

Even if the public were to suddenly embrace digitized documents, publishers have yet to perfect ways of making them pay for it. Online magazines charging subscription fees struggle because they violate the traditional 'Net paradigm of free information. Some ad-based Web 'zines are failing because the costs of recruiting advertisers are greater than ad revenues.

Publishers apparently realize it will be a while before they mine gold from electronic publishing. Their main motivations in publishing electronically, according to the Rose survey, are making the company look leading-edge and increasing awareness of the publication. Obviously this isn't the quick route to impressive profits.

We're most likely to see a combination of print and electronic publications. Print publications will remain strong. But plugged-in readers can use CD-ROMs bundled in magazines to see video and sound clips of a celebrity interviewed in the print version. They also could go online to get breaking updates on a financial story they read in the latest print publication, which was printed weeks ago even though it's the latest issue. The strengths of print, CD-ROM, and the Web probably will make each an indispensable part of a new informational triumvirate. Print may be here to stay, but it will have to make room at the table. ■

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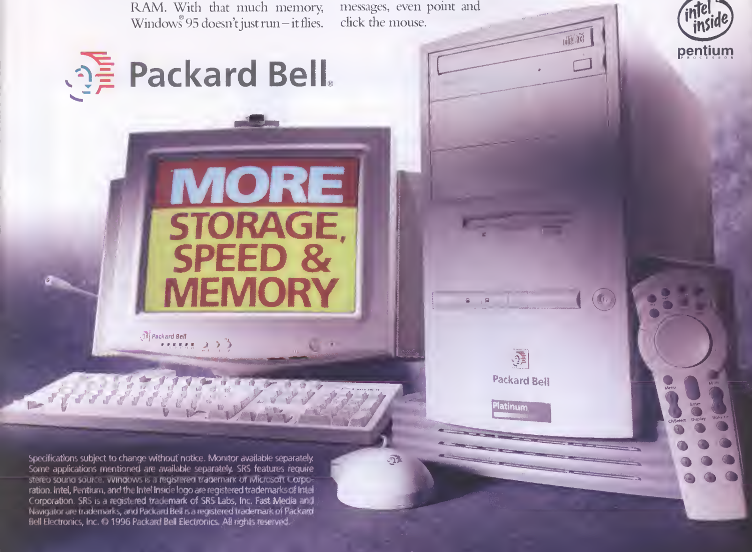

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